

# NORTH CAROLINA SCIENCE AND TECHNOLOGY RESEARCH CENTER

A DIVISION OF THE DEPARTMENT OF NATURAL AND ECONOMIC RESOURCES

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## FINAL REPORT ON A REGIONAL TECHNOLOGY TRANSFER PROGRAM

CASE FILE  
COPY

Contract NASW 2320

Period Covered: November 1, 1971 - October 31, 1972

**FINAL REPORT ON A  
REGIONAL TECHNOLOGY TRANSFER PROGRAM**

**NORTH CAROLINA SCIENCE AND TECHNOLOGY RESEARCH CENTER**

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**Contract NASW 2320**

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## ABSTRACT

NC/STRC, a Regional Dissemination Center for the southeastern United States, undertook a major public relations project by coordinating the largest educational exhibit ever presented at the NC State Fair - NASA's contributions to all mankind through research and development. "Returns from the Future" was attended by over one-quarter million people.

At NC/STRC, emphasis was placed on increasing search capabilities through improvements in software and acquisition of additional computer-searchable files to complement current information resources especially those of value to the textile industry.

The Library Search Service was expanded to include 33 college and university libraries and some progress was made in obtaining annual subscriptions from these institutions to support the LSS program in their particular schools.

Industrial marketing was heavily dependent on four new brochures used in an extensive mailing campaign, and the monthly publication Technical Bulletin which has proved highly successful.

NC/STRC processed 865 retrospective searches plus 582 current awareness profiles, and provided 2,730 documents to its clients. The average turn-around time for NASA and GRA searches was 5.9 working days.

# **NORTH CAROLINA SCIENCE AND TECHNOLOGY RESEARCH CENTER**

## **FINAL REPORT ON A REGIONAL TECHNOLOGY TRANSFER PROGRAM**

### **Introduction**

**This report is submitted in fulfillment of the requirements of National Aeronautics and Space Administration Contract Number NASW 2320. The period of performance began November 1, 1971, and ended October 31, 1972.**

**Recognizing that this is a report on the *continuing* operation of a Regional Dissemination Center, it attempts to evaluate progress and analyze associations with clients not only for the period of this report but in relation to the preceding contract period as well. It is divided into five sections and three appendices. Section I outlines the background and organization of NC/STRC, its status as a state agency, and the importance of the Research Triangle Park to its operations. On the basis that marketing must antedate service, Section II discusses marketing methods and results, and Section III combines an analysis of client types with the services provided. Section IV deals with computer software and information resources.**

**NC/STRC's most concerted single public relations effort is described in Section V, and the three appendices cover an updated transfer case (A), exhibits (B), and travel and visitors (C).**

## **I. NC/STRC: BACKGROUND AND ORGANIZATION**

### **A. Background**

The North Carolina Science and Technology Research Center (NC/STRC) was created by the state legislature in 1963 in an effort to raise the economic level of the state through support of space-age research to benefit industry. North Carolina was then near the bottom of the national per capita income scale, being heavily dependent on agriculture, furniture, tobacco, and textiles. Besides low wage scales, these industries were also suffering from slow growth or, in some cases, actual recessions.

Government and business leaders in North Carolina felt that an effort should be made to attract to the state modern, growing industries which offered higher wage scales. In order to do this, a business and educational climate attractive to these high-technology industries was considered essential. To help create and maintain this climate, NC/STRC was established and became operative in 1964.

Since that date, NC/STRC has served as a NASA Regional Dissemination Center (RDC) for the Southeastern United States under the following successive contracts:

NASr-235  
NSR 34-007-003  
NSR 34-007-006  
NASW 2051  
NASW 2320

NC/STRC was the fourth RDC to be organized under NASA sponsorship



and has occupied a unique place within the RDC network in that it is the only center which is not a program of a major university. Originally an independent agency of state government, answerable to the Board of Science and Technology under the chairmanship of the governor, NC/STRC is now a division of the N. C. Department of Natural and Economic Resources, closely allied with the Commerce and Industry division.

For all practical purposes, the policies and functions of NC/STRC have not been altered by the reorganization in state government. Some mechanics of administration, particularly in the areas of personnel and budget, have been standardized and clarified; however, the operation of NC/STRC as a NASA-sponsored RDC has not been affected. Any changes made in the program in the past year have been due primarily to factors other than reorganization.

The Board continues to serve as the administrative or parent unit through which support from the state is channeled.

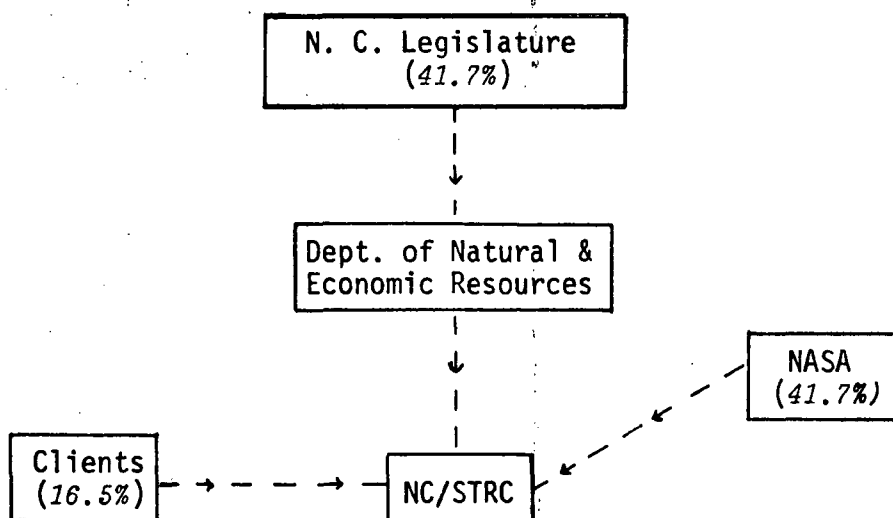


Figure 1

*NC/STRC's Income by  
Source*

## B. Internal Organization - Staff

The organizational set-up of NC/STRC has remained unchanged for the past two years. Areas of responsibility and chain-of-command are as set out in the chart on page 4.

Two additional members have joined the professional staff: Miss Sylvia Sanders and Dr. Monica Nees. Miss Sanders, a graduate of NCSU's School of Engineering, worked several months on a part-time basis prior to an appointment as applications engineer in the field of industrial engineering.

In August 1972, Dr. Monica Nees, formerly with the New England Research Applications Center at Storrs, Connecticut, joined the staff of NC/STRC as an information specialist in the fields of chemistry and biology.

A breakdown of NC/STRC personnel by category is given below:

<u>Position</u>	<u>People</u>	<u>Full-time Equivalent</u>
Administration	3	1.5
Applications Engineering	5	5
Consultants	2	.4
Computer Professionals	2	2
Information Specialist	1	1
Marketing	2	2
Clerical and Other	<u>14</u>	<u>12</u>
Totals	29	23.9

During the summer, a graduate student in engineering and an undergraduate in mathematics were employed by NC/STRC to assist on special projects. An additional clerk was hired on a temporary basis to assure continued service to clients during the vacation period. These are not included in the figures given above.

Positions indicated with broken lines serve both Board and Center.

\*Part-time or temporary positions.  
Secretaries not shown.

## Figure 2

### C. Facilities

NC/STRC is situated in the Research Triangle Park, a growing research complex centrally located between the state capitol of Raleigh (home of N. C. State University), Durham (Duke University), and Chapel Hill (site of the University of North Carolina). The role of these three universities insofar as the Park is concerned was set out in the early 1950's:

"... the principal functions of the universities are to stimulate industrial research by the research atmosphere their very existence creates and to supplement industrial research talents and facilities by providing a wellspring of knowledge and talents for the stimulation and guidance of research by industrial firms."\*

The universities have indeed played this role very effectively, as evidenced by the steady growth within the Park in the past decade and the number of consultants and adjunct professors who travel between Park and campus.

In the nine years since NC/STRC became the sixth tenant in the Park, the number of research facilities located here has increased to 18, with three others scheduled to occupy quarters at a later date. (See map, page 6).

Park tenants actively engaged in research include:

- American Association of Textile Chemists and Colorists
- Beaunit Fibers
- Becton, Dickinson and Company Research Center
- Burroughs Wellcome Company
- Chemstrand Research Center, Inc.
- Hercules, Inc.
- International Business Machines
- National Center for Health Statistics
- National Environmental Research Center
- National Institute of Environmental Health Sciences
- Research Triangle Institute
- Southern Testing and Research Laboratories, Inc.
- U. S. Department of Agriculture - Forest Service

\*Luther H. Hodges, *Businessman in the Statehouse: Six Years as Governor of North Carolina* (Chapel Hill Press, 1962), pp. 206-07.

# NORTH CAROLINA'S RESEARCH TRIANGLE

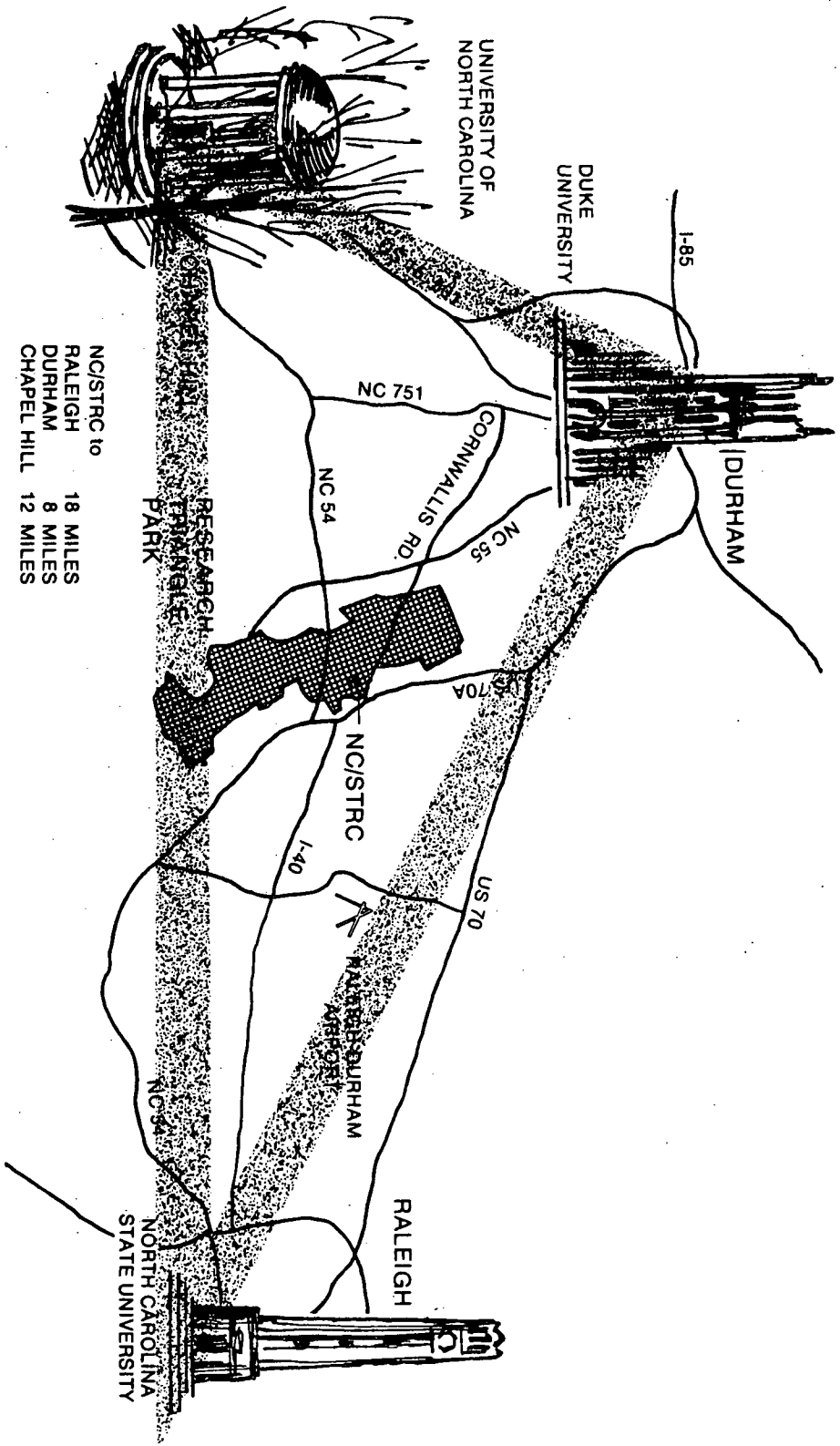


Figure 3

Access to this comparatively rural area has been greatly improved in the past year with the opening of Interstate 40 from Raleigh. Another stretch linking the Park to Durham is scheduled for completion within a few months, and an expressway between the Park and Chapel Hill is in the planning stages.

The Science and Technology Research Center building presently houses the Triangle Universities Computation Center (TUCC) and the Educational Computing Service (ECS) in addition to its own facilities. The U. S. Post Office previously housed in the building has been relocated to permanent quarters in the Park's Service Center, thus releasing 1,135 sq. ft. of office area which has since been renovated and now houses the ECS offices. The ECS move, in turn, released more space to TUCC and NC/STRC on the upper level of the building.

NC/STRC is fortunate in having access to the highly sophisticated computation center operated by TUCC. The computer, an IBM System 370, Model 165, is owned jointly by the three Triangle universities and because of its immense speed and capacity can process NC/STRC's searches more economically and swiftly than any other computer system in the area. Access is achieved through either a remote terminal or the usual IBM punch cards. (See Section IV, Computerized Information Resources and Activities.)

The proximity of both the Research Triangle Institute and the three Triangle Universities has been of great benefit to NC/STRC, particularly in the early years of its existence. NC/STRC continues to draw on the expertise of these four institutions to supplement the capabilities of its own staff.

#### **D. Equipment**

Specialized equipment for NC/STRC is constantly being evaluated for its efficiency, and outmoded items are replaced as soon as feasible. During the twelve months covered by this report, equipment at NC/STRC included:

- IBM Magnetic Tape Selectric Typewriter Model IV
- Xerox 3600 electrostatic copying machine with 20-copy collating capabilities
- Recordak Model 1824 Reader-Printer for microfiche reproduction
- Atlantic Model 609 Microfolio for microfiche-to-microfiche copying
- Teletypewriter
- Teletype Computer Terminal
- Data Point 3300 CRT Terminal for remote entry of search

An Itel Word Processor was used for several months on a trial basis but was judged to be less satisfactory than the IBM MT/ST which was retained. A used Recordak reader-printer was sent to NC/STRC from Wayne State University's CAST but the cost of renovation and repairs would have exceeded that of a new machine. Therefore, in accordance with recommendations of the Property Administrator, the machine was transferred to the Federal Surplus Property Agency.

Although regular single-pitch IBM Selectric typewriters are used for correspondence, two dual-pitch Selectrics were purchased during this period to provide extra flexibility in preparing camera-ready copy for the monthly Technical Bulletin and the various Fact Sheets which comprise much of the marketing material.

## **II. MARKETING**

### **A. Territory**

NC/STRC's marketing effort is concentrated in eleven southeastern states - roughly, the area from the Potomac River south to Florida, west to Louisiana, northward through Mississippi and eastern Tennessee to West Virginia (see map, Figure 4). Inquiries received from outside this region are answered by suggesting that the inquirer use the services of a nearer NASA RDC. However, in cases where NC/STRC has special resources and expertise, services are provided to clients outside this region. Under a resource-sharing arrangement with the other NASA RDC's, NC/STRC performs machine searches of seven data collections for other RDC's located in California, New Mexico, Indiana, Connecticut, and Pennsylvania.

The southeastern section of the United States can be characterized as a predominantly agricultural area which is becoming industrialized. North Carolina and Georgia are leaders in industry, but manufacturing is heavily weighted towards labor-intensive industries such as textiles, apparel, and furniture. Although many large national corporations have plants in the area, these plants are concerned principally with the production of items designed and developed in other parts of the country. The majority of research in the Southeast is performed in universities, non-profit research institutes, and a few industrial research laboratories. An encouraging development is the movement to the region of a number of research facilities,



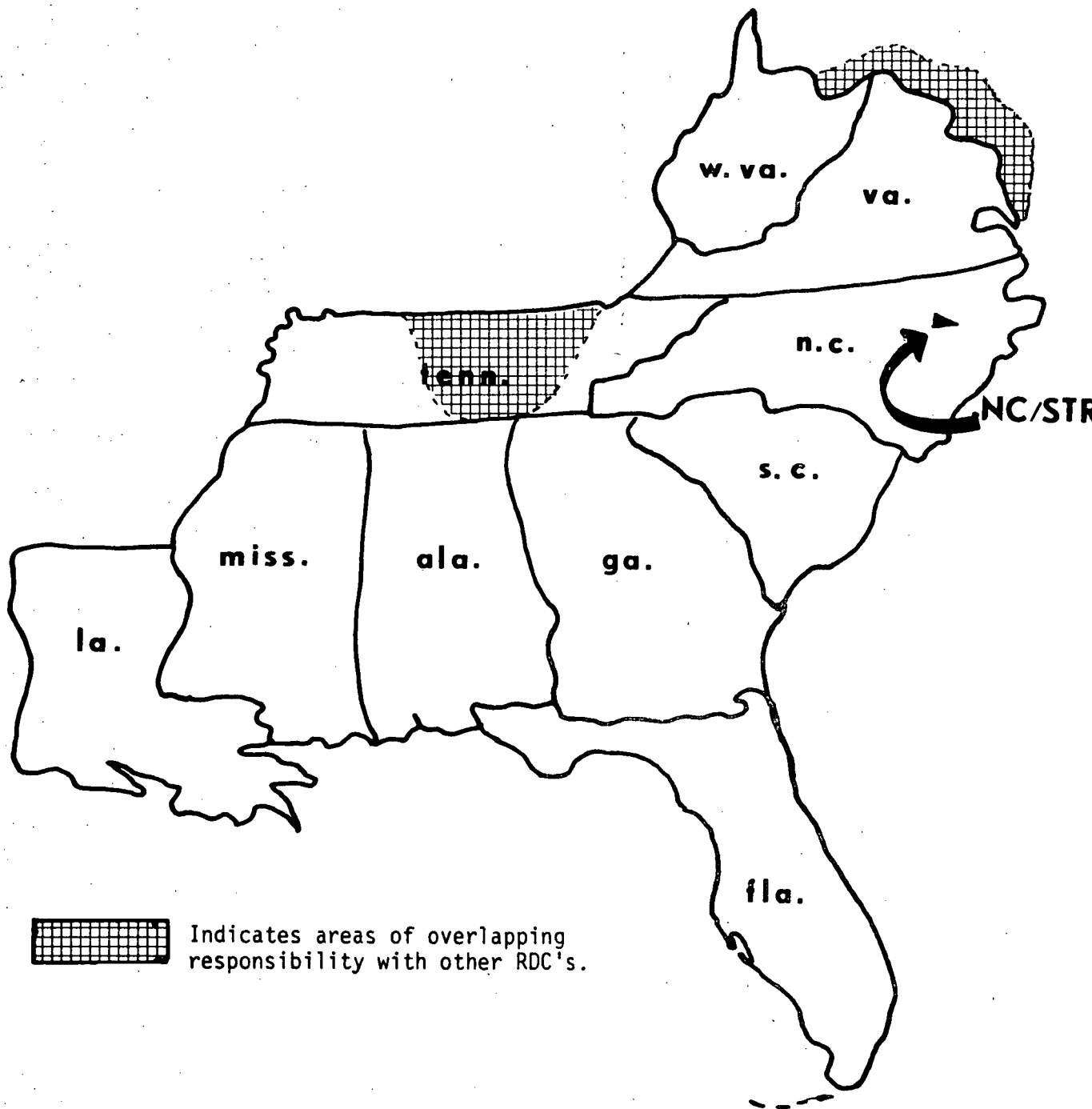


Figure 4

NC/STRC's Marketing Territory

both private and governmental; an excellent example is the concentration of research organizations in Research Triangle Park, North Carolina.

#### B. Methods

The NC/STRC approach to marketing has been to develop lists of potential prospects from industrial directories and similar references. Because of the wide geographical area involved, direct mail is used to elicit some indication of interest, and this is followed and supplemented by telephone calls to arrange for personal visits. Direct mail marketing is carried out by means of two newsletters and also by specific brochures.

#### Technical Bulletin

The excellent response to the Technical Bulletin, as evidenced by an average of 50 documents ordered per month, was used as the basis of follow-up calls for regular search services by the marketing staff. These respondents had been pre-qualified before being added to the TB mailing list; their willingness to pay for documents selected by NC/STRC was therefore considered evidence that they could use the much wider searching services of the center.

The marketing staff, in making the follow-up calls, found that the vast majority of the customers ordering documents fell into one of two categories:

- a. present clients with whom we already have a good working relationship but who were ordering documents outside their regular areas of interest on a one-time or ad hoc basis;
- b. non-clients who ordered documents which filled either an immediate company need or the personal interests of the engineer or technician who

received that issue. For instance, an engineer might order a document dealing with a rapid patch for concrete or a family-sized gas fuel cell for the home because these are of interest in his personal life. They do not, however, reflect a need for a fully automated information search within his firm. Many of the documents ordered deal with management and personnel problems; again, not indicative of a continuing need for technical information.

Despite this, the Technical Bulletin is still considered a good marketing tool in that it keeps companies aware of NC/STRC's capabilities and continued interest in them; it provides a barometer of interests and needs within our clientele and potential clientele; it provides entree into companies which we might otherwise have difficulty contacting. Hopefully, at some future date, some of these engineers, technicians, and companies will have need of full NC/STRC services and remember, via the Technical Bulletin, where they can be obtained quickly and economically.

The mailing list for the Bulletin is carefully maintained at approximately 1400 names which are stored on computer tape. These are printed only twice a year, with six labels for each name, and sorted by ZIP code. At present, the Bulletin is distributed under a Third Class mailing permit and the restricted mailing list is in the interests of both postage and labor required to process for mailing.

The remaining 100 copies printed are used for personal hand-outs to potential clients.

Tables I and II below analyze the returns from the Technical Bulletin.

TABLE I

*Technical Bulletin Replies*

	<u>Issues 7-9</u>	<u>Issues 10-12</u>	<u>Issues 13-15</u>	<u>Issues 16-18</u>	<u>Totals</u>
Mailings	3184	3272	3509	3854	13,819
Cards Returned	106	68	99	140	413
Per cent Returned	3.3	2.1	2.8	3.6	3.0
Individuals Responding	91	62	77	84	314
No. of Items Requested	181	130	162	223	696
No. Industries Replying	75	50	77	84	286
Income from Documents	\$ 548	\$ 350	\$ 551	\$ 498	\$ 1,945

TABLE II

*Documents Ordered from TB by Subject Category*

	<u>Issues 7-9</u>	<u>Issues 10-12</u>	<u>Issues 13-15</u>	<u>Issues 16-18</u>	<u>Totals</u>
Materials	62	14	24	72	172
Management	36	26	35	26	123
Production Technology	0	49	16	14	79
Miscellaneous	5	8	8	27	48
Protective Coatings & Lubricants	1	0	28	15	44
Safety	26	2	1	13	42
Machinery & Equipment	24	5	1	7	37
Pollution	1	4	0	29	34
Joining & Fastening	1	15	3	10	29
Analysis & Testing	10	3	9	5	27
Reclamation & Salvage	0	4	15	5	24
Textiles	2	0	22	0	24
Electronic & Electrical	13	0	0	0	13

## TECH TOPICS

The quarterly newsletter TECH TOPICS, which combines items of interest on the Board's research programs as well as the Center's Technology Utilization program, continues to attract readers and feedback. The mailing list is carefully screened before each mailing, and all deletions, corrections, name and address changes, and additions are made at this time. With few exceptions, every name on the list has been added at the personal request of either an NC/STRC staff member or by the addressee himself. The list is cross-indexed by individual's name as well as company, and the computer which prints out the labels also sorts the addresses by ZIP code. Of the 5,000 copies printed each quarter, approximately 4,750 are distributed via a special Second Class Mailing Permit to those on the regular mailing list. The remaining 250 are used as handouts, to answer mail inquiries, and in marketing packets.

One special class within the mailing list is libraries, both public and technical. We have tried to reach all such libraries within North Carolina and most throughout the Southeast. In addition, we frequently receive requests from libraries outside this region for complete sets of TECH TOPICS.

Like the Technical Bulletin, TECH TOPICS is considered a marketing tool, although in a limited way. It is not issued as frequently as the TB, seldom offers tangible services or documents, and carries a number of items of no interest outside North Carolina. It seems effective, however, and excerpts from readers' comments follow:

"I have just finished reading a copy of the November 1971 edition of your TECH TOPICS and find myself impressed. Could you tell me how I would go about getting on the distribution list?"

- *W. M. Cowhig, III*  
*Development Engineer*  
*Western Electric Company*

"I recently was fortunate enough to receive a used copy of TECH TOPICS. The article on 'Waste Disposal and New Technology' was timely and informative. I would like to be put on the mailing list to receive TECH TOPICS regularly.

- *Stuart C. Froehling, Sr.*  
*Development Engineer*  
*Technical Products Division*  
*Brunswick Corporation*

"It makes one proud to receive TECH TOPICS. Please accept my congratulations for providing such informative articles."

- *William J. Pockl*  
*Plant Engineer*  
*Anaconda Wire and Cable Company*

"I would appreciate it if you could arrange to place my name on the distribution list for future copies of your publication. If there are any charges, I'd be happy to pay same."

- *Frank McGinnis, Director*  
*Product Assurance*  
*Sperry Rand Corporation*

### Brochures

Three new and relatively simple brochures were designed in 1971 and delivery effected by November. Actual distribution in a mail-out campaign began early in 1972; a second mailing was completed the following winter.

The three brochures, sent to pre-selected companies, each stress a different theme:

1. "Does your company need help closing the technology gap?"

This very simple 4-page leaflet defines a technology gap in industry and suggests three actions to help close it - increasing automation, use of better machinery, development of a new product. NC/STRC stands ready to help on all.

2. (No title) The general theme is that technical problems are solved, like other problems, more easily with the right tools. The right "tool" is, of course, information from NC/STRC.

3. "If this is your idea of finding information in scientific literature - you should hear about ours..."

The third 4-page leaflet in the series uses a cartoon character kneeling on a vast pile of documents to illustrate the almost hopeless task of manually searching today's information flood. A sub-theme is the benefits accruing to users of NC/STRC services, illustrated with actual case histories.

In June 1972, a much more detailed brochure was printed and has served as the main marketing piece since that time. Using a photograph of a computer as the keystone in a sketched arch of books, the cover reads, "This is the keystone to rapid, low-cost information retrieval." Various sections of the booklet deal with the use of computers to retrieve pertinent information ("how it's done"), methods of successful industrial researchers, areas of technology and science that can profit from NC/STRC services, types of services offered, and a brief background note on NC/STRC. The back cover includes a map of the Park, a flap to contain additional detailed inserts (such as fact sheets on particular files), and a line on which to write in the company's name for that personalized touch.

No direct feedback from these mail-out campaigns is possible as no immediate action was requested of the recipients. The brochures were designed primarily to do two things:

- provide information on NC/STRC in answer to inquiries;
- help establish a framework of reference for subsequent calls or visits by familiarizing the client with NC/STRC's name and mission, create an awareness of need within the company, and provide an introduction considered requisite to a cordial reception.

#### Design News

A series of articles in the magazine Design News has brought many requests for additional information on the NASA TU program. These have been forwarded by NASA to the appropriate RDC following initial response.



NC/STRC's marketing director answered each inquiry with a personal letter plus enclosures as applicable, usually the "keystone" brochure, a list of current information resources, a fact sheet on the file or files most appropriate to that inquiry, and a search request form.

Although a brief scanning of dates shows that NASA has been quite prompt in replying to the original inquiry, NC/STRC has sometimes not received the referral for two to three months. This time-lag naturally reduces the impact that any material from here might have.

Many of the queries have been found to come from teachers or other non-technical individuals with a personal rather than industrial interest, and follow-up, in most cases, is fruitless insofar as the TU program here is concerned. However, some requests for service are received apparently "out of the blue" and it is conceivable that the impetus may have been the Design News articles and marketing materials.

#### Personal Contacts

Although brochures and publications serve a useful purpose and are considerably less costly than extended marketing trips, personal contact between an NC/STRC staff member and a potential client is almost always necessary to carry that client from "potential" to "sold." L. M. Kelly, assistant director for marketing, often contacts a client two or three times

before this is accomplished. The first visit is usually exploratory and may result in little more than identification of NC/STRC's capabilities on one side and the areas of interest or concern on the potential client's side.

A second visit, sometimes accompanied by an applications engineer in the field most closely related to the client's interests, is often productive, although it may be several months before the client feels in need of immediate service. Such visits, and those made by the marketing staff, are grouped under "Marketing" in Table III below.

Repeat business, of course, is heavily dependent upon personal contact between engineer and client. Although in this sense they are marketing contacts, for the purpose of this report such visits are listed under "Technical." Often the distinction is more arbitrary than real.

TABLE III  
*PERSONAL CONTACTS*

	<u>29th Qtr.</u>	<u>30th Qtr.</u>	<u>31st Qtr.</u>	<u>32nd Qtr.</u>	<u>TOTALS</u>
<b>MARKETING</b>					
Visits	305	389	171	104	969
Letters	505	1,410	526	529	2,970
Telephone	277	318	228	364	1,187
<b>TECHNICAL</b>					
Visits	85	83	44	62	274
Letters	94	85	150	101	430
Telephone	254	232	186	146	818

### **C. University Marketing**

Promotion of the Library Search Service (LSS), an outgrowth of the graduate student program initiated at NC/STRC in 1968, continues at an active rate. A number of smaller schools and colleges have joined the LSS network during this contract period. These include:

New River Community College (Virginia)  
Center for Education Technology, State of New Jersey  
St. Petersburg Junior College (Florida)  
Teachers College, Columbia University (New York)

Two educational centers have joined the network as annual subscribers during the period reported. These are:

Glenville State College, Glenville, West Virginia  
Appalachia Regional Educational Laboratory

The LSS hopes to attract more schools on an annual basis by showing that it is more economical to subscribe to NC/STRC services than to hire additional library staff members.

In March of the period covered, 1,500 copies of NC/STRC's list of information resources were sent to the D. H. Hill Library at N. C. State University in Raleigh at the request of the library's director, Dr. I. T. Littleton. Along with the list of resources, Dr. Littleton sent a personal memorandum to NCSU faculty members who he believed could profitably use NC/STRC services.

A new brochure detailing the capabilities of the LSS was printed during this period and has been used in an extensive mailing campaign. These are also used continually as handouts to current and potential clients.

### **III. OPERATIONS**

#### **A. Clients Served**

The original concept of RDC-client relationship at NC/STRC was based on an annual subscription, prepaid, which would constitute a drawing account against which all services performed for the client would be charged. Once the subscription was entered, the use of it was left pretty much to the discretion of the researcher and the NC/STRC applications engineer who serviced the account. Documents were provided at no additional charge and there was virtually no limit to the number of bibliographic citations included. (At that time, NC/STRC used a linear file and computer print-outs included all bibliographic data. Since 1968, the computer print-out has consisted of accession numbers on and an abstract card must be hand-pulled for each citation.)

Some companies, although satisfied with NC/STRC's services, felt it impractical to have on deposit here funds which were not being regularly used. Research projects were sometimes dropped, experimental programs were phased out, government contracts were being cancelled. When any of these happened - or all - computer searches were usually among the first expenditures to be dropped.

For several years, NASA pressed the RDC's to obtain all clients under annual agreements. By 1968, however, it was persuaded that many potentially good clients were being lost through this policy. Demand or ad hoc clients

then became - if not welcome - acceptable.

Both existing and potential clients appreciated the new policy which offered them a choice of type of commitment. Many firms now felt free to request service on a trial basis, something which had not really been possible before.

For reporting purposes, only those demand clients who actually received service during a report period are included. Many companies, of course, remain good clients even though the time between service requests may extend over a particular report period. Under the present system, clients are defined as:

**Annual Subscriber**

A client who has a drawing account of no less than \$500, or

A client who has a current awareness profile subscription for no less than 12 months.

**Demand Client**

One who has less than \$500 in a drawing account, or

One operating on a pay-as-you-go basis and requesting service during the report period. (Expenditures under \$50 are not included here.)

The type of service agreement entered into by a company is probably dependent upon one of two factors:

- the needs of the company for frequent and/or continuous service;
- the fiscal set-up within the company (mechanics and policies of handling accounts payable).

The importance of demand clients to NC/STRC is shown in Figures 5 and 6 below. Figure 5 shows the rapid increase in number of demand clients served over the past five years; Figure 6 indicates the amount of income from demand clients has, in the past year, topped that from annual subscribers.

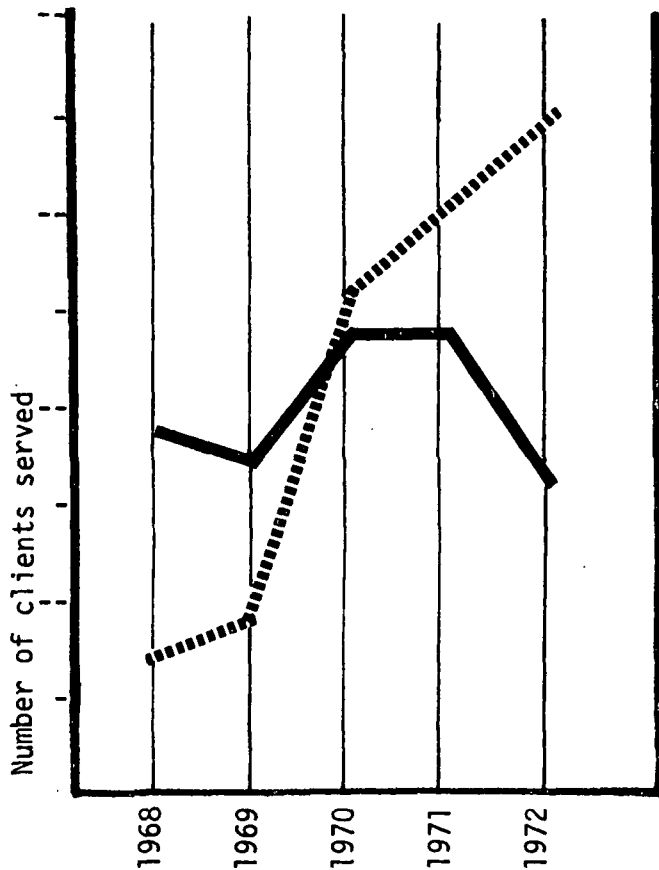


Figure 5

Annual vs. Demand Clients:  
Number of Companies  
Served

D  
— Annual    ..... Demand

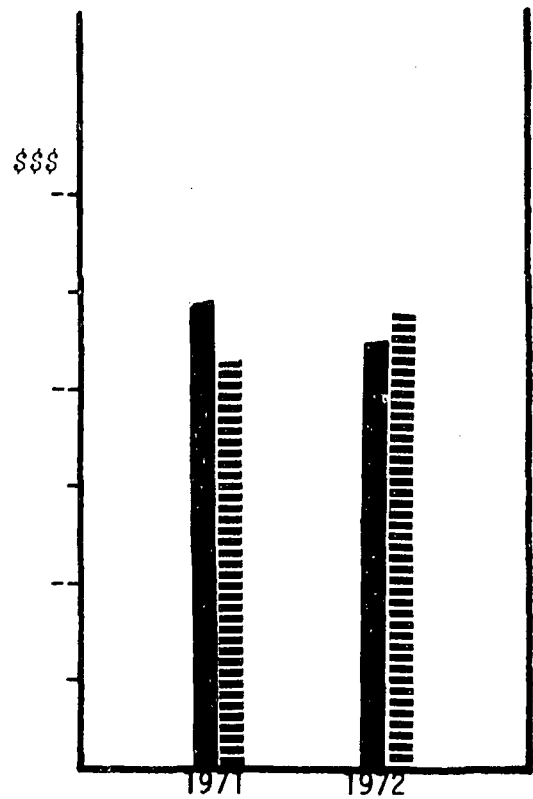


Figure 6

Annual vs. Demand Clients  
Income

— Annual    ▨ Demand

The chief source of NC/STRC client revenue - as well as the prime target of its marketing effort - continues to be the industrial client; however, NC/STRC has long recognized the value of two other general types of clients: wholesale (such as other RDC's) and university libraries. At the end of this contract period, NC/STRC was serving five RDC's and 27 educational institutions.

Tables IV, V, and VI on the following pages analyze NC/STRC clientele in several ways: type of organization served, company size of annual manufacturing clients, and manufacturing subscribers by SIC classification. The heaviest users of service continue to be firms in SIC classification 28: Chemicals and Allied Products. This is due, of course, to the predominance of textile, manmade fibers, and fiber processing industries in the Southeastern states.

TABLE IV	
<i>TYPES OF ORGANIZATIONS SERVED</i>	
<u>Annual Subscribers</u>	<u>Numbers</u>
Manufacturing firms	22
Research organizations	9
Educational institutions	<u>1</u>
Sub-total	32
<u>Demand Users</u>	
Manufacturing firms	21
Research organizations	6
Educational institutions	27
Other RDC's	5
Government agencies	<u>6</u>
Sub-total	<u>65</u>
TOTAL	97

TABLE V

*COMPANY SIZE OF MANUFACTURING CLIENTS  
ON ANNUAL SUBSCRIPTION BASIS*

<u>Number of Employees</u>	<u>Number of Clients</u>	
	<u>Nov. 1971</u>	<u>Oct. 1972</u>
1-25	1	5
26-50	0	0
51-100	3	4
101-250	3	6
251-500	4	4
501-1000	5	5
1001-1500	8	3
1501-2500	4	2
2501-3500	1	2
3500 & Over	2	1
	<u>31</u>	<u>32</u>

TABLE VI

*MANUFACTURING CLIENTS BY SIC CLASSIFICATIONS*

*(Annual subscribers only)*

<u>Classification</u>	<u>Number of Clients</u>	
	<u>Nov. 1971</u>	<u>Oct. 1972</u>
21 Tobacco Manufacturing	1	1
22 Textile Mill Products	5	6
26 Paper Products	1	0
28 Chemical & Allied Products	14	12
33 Primary Metal Industries	2	4
35 Machinery, Except Electrical	2	1
36 Electrical Machinery, Equipment & Supplies	4	4
37 Transportation Equipment	1	1
38 Professional, Scientific & Controlling Instruments	1	2
39 Miscellaneous Mfg. Industries	0	1
	<u>31</u>	<u>32</u>



## **B. Types of Service**

Several types of service are offered to NC/STRC clients. The latest marketing brochure lists the following:

<b>Retrospective searching</b>	A complete review of a file from its inception through the last update for information on a particular topic.
<b>Current Awareness</b>	A review of each update as it is received for information on a specific subject.
<b>Referral services</b>	Suggesting to clients sources from which special materials or services (such as consulting) may be obtained; also, possible markets for products and waste materials.
<b>Applications engineering</b>	Assisting clients in applying information retrieved in searches to the solution of the client's problem.
<b>Workshops</b>	Conducting discussion and training sessions on specialized topics to which clients are invited.
<b>Documentation</b>	Providing complete documents either in hard copy or on microfilm (as available and desired).

In addition, two NC/STRC publications\*, plus items selected by the applications engineers from daily scanning of technical literature, are sent without charge to both current and prospective clients.

Naturally, the type of NC/STRC service desired is largely dictated by the nature of the client's need. Applications engineers make recommendations for extent of coverage based on file content and problem area. A uni-

versity researcher may request everything that can be uncovered from all available files on a topic or topics pertinent to a highly specialized field; a manufacturer, on the other hand, may prefer a continuing awareness of the latest advances and innovations in a much broader area of interest. Both the professor and the manufacturer may combine two or more services over a period of time, or change from one type of service to another. Hopefully, they will take advantage of all types of service at some point in the association. NC/STRC tries to be flexible in the services it offers.

During this contract period service statistics reflected the national economic trends: the slackening of federally-supported research in universities, the cut-back in the space program which quickly filtered down into smaller businesses through sub-sub-sub-contractors and all the peripheral industries, and the tightening of budgets within companies to help meet rising costs of labor and materials. Figures 7 through 9 on page 28 contrast the number of searches processed during this contract period as opposed to those run in the previous year. Table VII, page 37, gives a statistical breakdown on all types of services.

### RETROSPECTIVE SEARCHES

Retros are the backbone of information retrieval services at NC/STRC. Although the mechanics of extracting relevant data may vary in the case of files such as BIOSIS and Engineering Index, a retrospective search on the NASA, CRA, and several other files will be processed as follows:

Figure 7: *Retrospective searches for Industrial Clients*

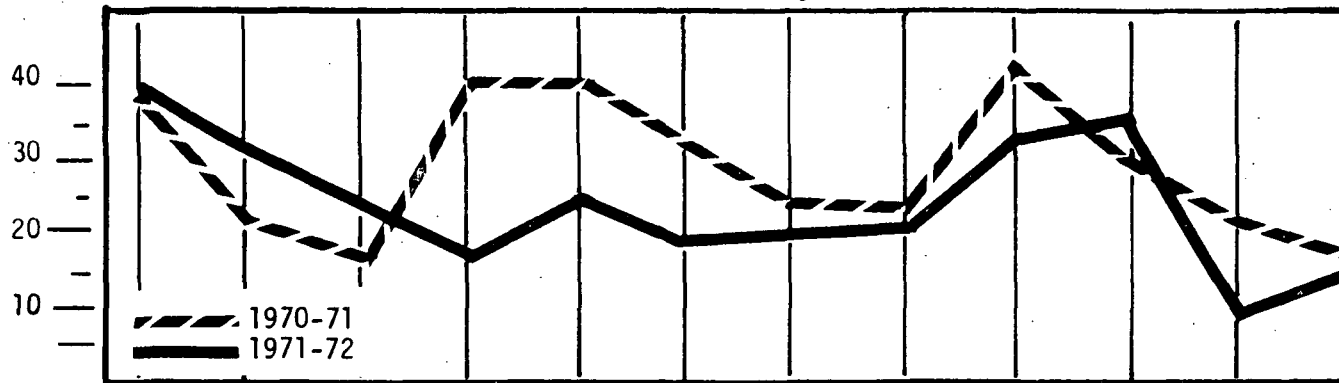


Figure 8: *Library Search Service searches*

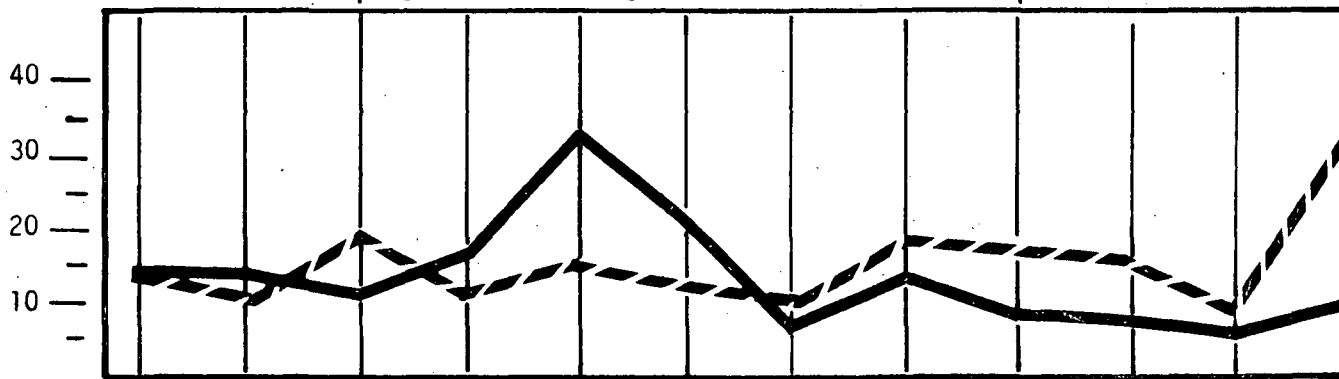
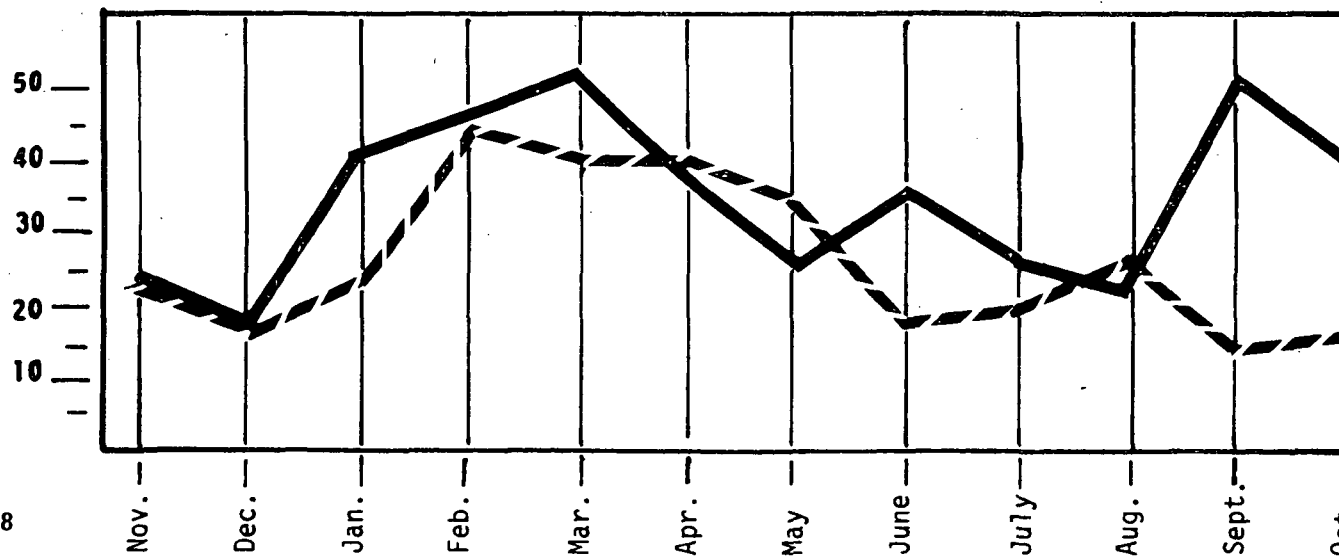


Figure 9: *Wholesale searches for other RDC's*



The applications engineer servicing the account receives an order for a retrospective search of, for instance, the NASA files. He prepares a request for a work-order (Exhibits B-1 and B-2) and this pre-numbered card follows the job throughout the entire process.

Once the work-order has been issued by the supervisor of customer service, the applications engineer designs his strategy, based on his knowledge of the file's contents and his own expertise in the particular field being re-searched. A "Request for Search" (Exhibit B-3) transmits his strategy to the technical assistance section which completes the load-sheets, keypunches the cards, and receives the printout from the computer. The printout is then checked by the applications engineer for successful strategy as evidenced by the number of citations retrieved. Since this can be fairly accurately predicted in advance from the terms and postings listed in the dictionaries, any exceptional deviation from the predicted number usually indicates errors in search entry. Sometimes, the difficulty is in differing interpretations of the meaning of index terms.

For the past several years, NC/STRC has designed searches to produce no more than 300 hits on the average, and has maintained a limit of 300 abstracts delivered per search on its basic files: NASA, GRA, and ITT. (Should a client wish abstracts in excess of this number, he is charged for them at a flat rate per abstract.) .

Once a satisfactory printout has been received, abstract cards are pulled which the engineer reviews manually, selecting those which are pertinent to the original question and often those which have peripheral interest. These cards are reproduced on the Xerox machine and bound into book form, along with the search strategy, computer printout, list of information resources at NC/STRC, and an order blank for full documentation of citations. The package is transmitted to the client and the work-order is closed. (Figure 10, page 31)

For the twelve months covered by this contract, NC/STRC processed 258 searches for its industrial clients. From these searches, 88,049 citations were retrieved and 44,687 were considered pertinent by the engineers who evaluated them - approximately 50% relevancy.

Data collected from the work order accompanying each search show an average of 1.5 hours of engineering time required to write a search; 1.96 hours of clerical time needed to process it for the computer and pull abstract cards; and an additional 1.9 hours normally used in evaluating a search before tendering it to the client.

Turn-around time for searches is dependent upon several factors: current workload of staff, priority requested by client, and, most heavily, the file being searched. The average turn-around time for NASA and GRA searches is 5.9 working days; the minimum is less than one day. However, for BIOSIS, the maximum time to process a search from order to delivery has run as high as 39 working days. NC/STRC normally quotes ten working days for delivery of a search to a prospective client.

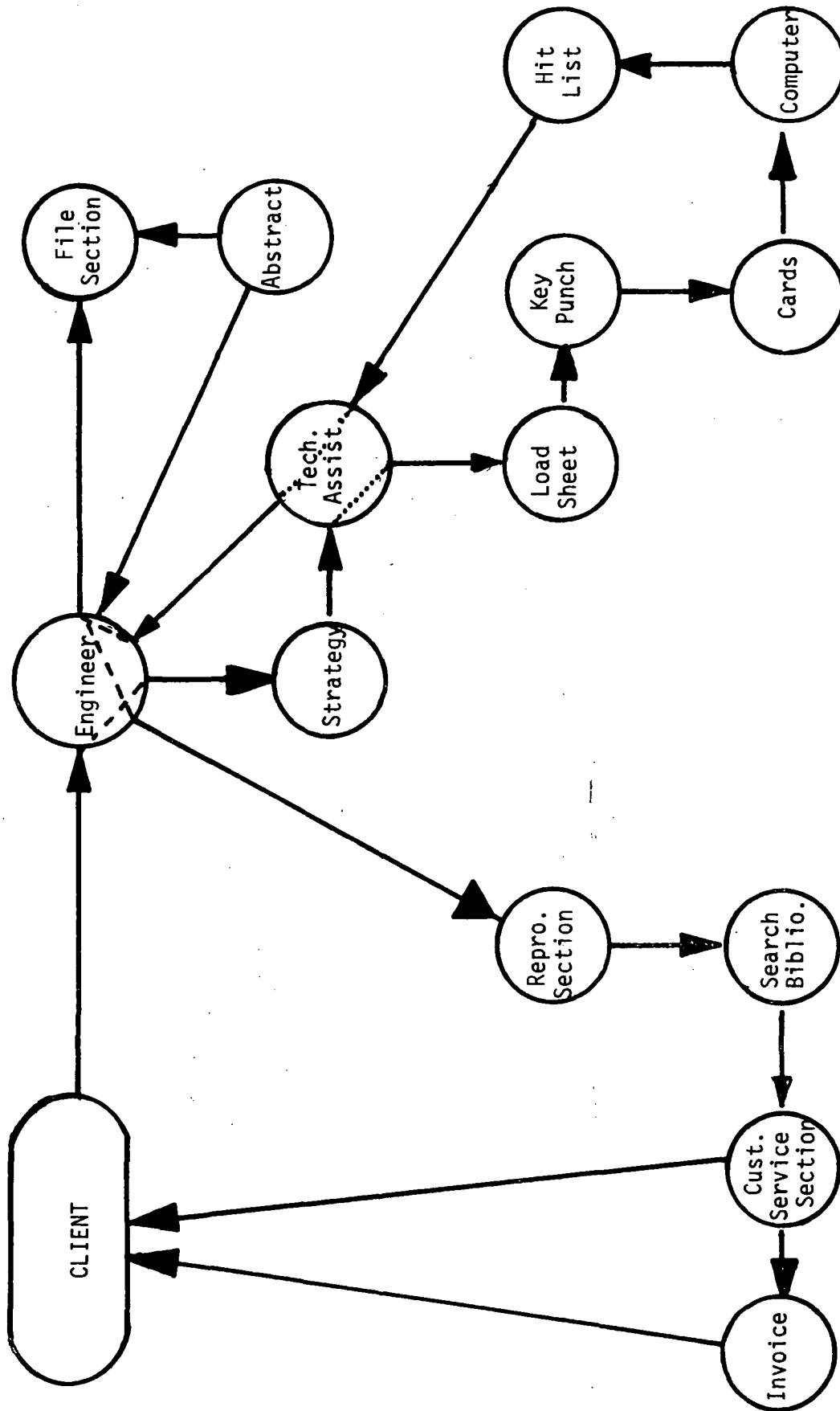


Figure 10: Processing a Retrospective Search

## **INFORMATION RESOURCES**

At the beginning of this contract period, NC/STRC was searching by computer - or had access to - the following files:

- National Aeronautics and Space Administration (NASA)
- U. S. Government Reports Announcements (GRA)
- Engineering Index (EI)
- American Society for Metals (ASM)
- Educational Resources Information Center (ERIC)
- Chemical Abstract Condensates (CA-C)
- Chemical Titles
- Infrared Spectral Information System (ISIS)
- Institute of Textile Technology (ITT)
- MIT Textile Information
- Biological Abstracts (BA)

Several other files have been added during this contract period:

- IFI/Plenum Uniterm Index to Chemical Patents
- World Textile Abstracts
- Medline
- Food Science and Technology Abstracts
- Smithsonian Science Information Exchange

and two are no longer advertised as available:

- American Society of Metals
- Chemical Titles

(See Section IV., COMPUTERIZED INFORMATION RESOURCES AND ACTIVITIES.)

## **CURRENT AWARENESS PROFILES**

Current awareness searches cover only that material which has been added to a file since the last search was run - usually a one-month period. This enables a company to keep abreast of the latest technological developments in their individual fields, at little cost or effort to their staff. Screening of these searches varies among clients. Some prefer to receive

the entire list of citations while others want handscreening by the engineer. However, because of the short period of time involved, a small number of documents is usually retrieved. It is not uncommon for a search to retrieve zero citations if the subject area is very restricted.

Figures given in Table VII., Service Statistics, under CA Profiles indicate those which have been completed and delivered to a client during a given period. Fluctuation in number completed each month varies as a result of several factors: late receipt of journals at NC/STRC, frequency of file updating, and dispatch with which the staff can reproduce abstracts and complete paperwork necessary to each search.

#### STANDARD INTEREST PROFILES

Standard Interest Profiles differ only slightly from Current Awareness Profiles. The subject matter is broader in scope than individually tailored current awareness searches and deals with a topic of common interest to many companies. SIP's are not produced by STRC but are obtained for clients from other RDC's.

#### DOCUMENTS

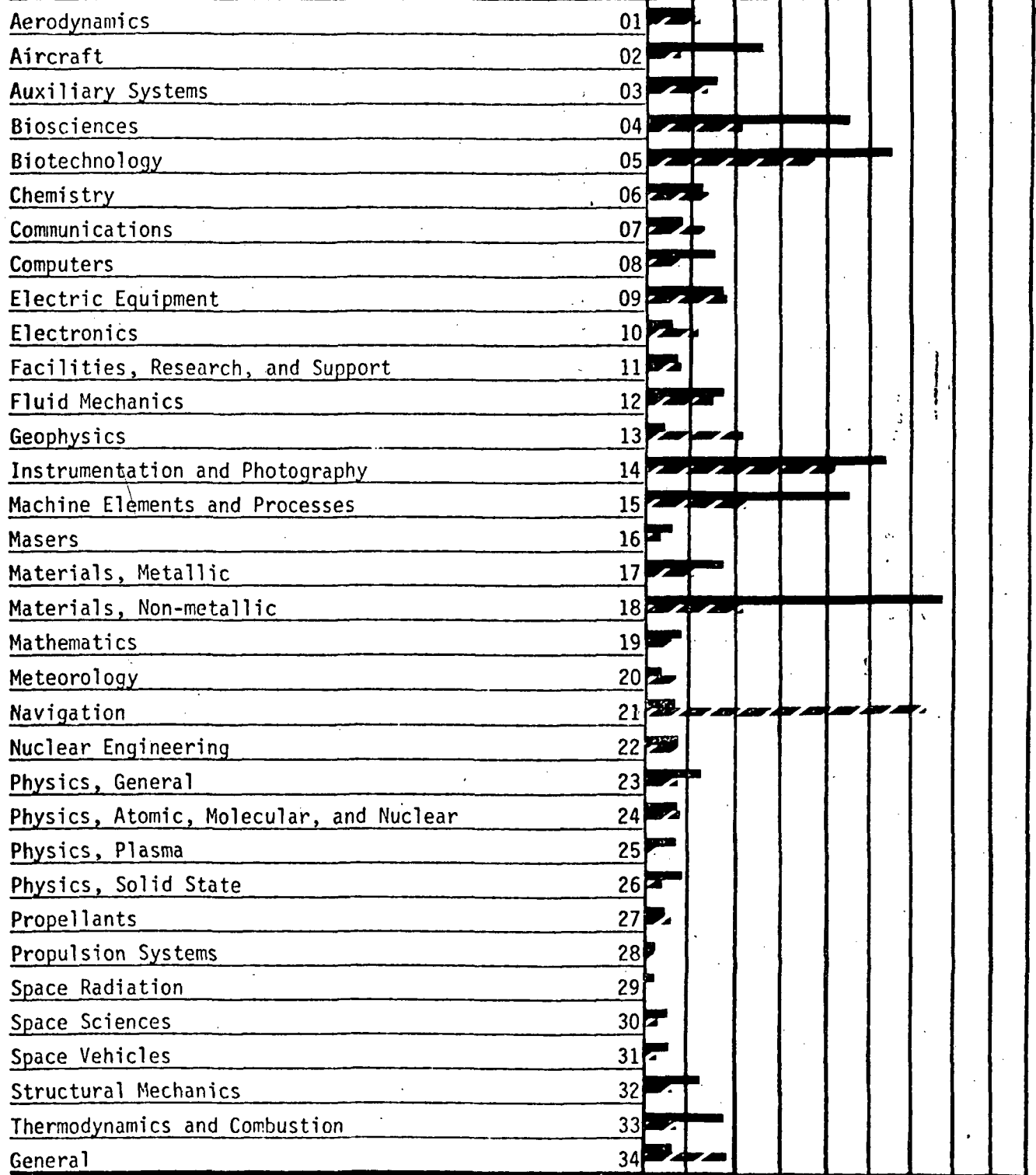
During this twelve-month period, NC/STRC mailed out a total of 2,730 documents, including those ordered from the Technical Bulletin. The majority were secured from outside sources such as the National Technical Information Service and the Aerospace Research Applications Center because of the relatively high cost of reproducing them in-house. (Exhibit B-4)

Some can be classified under STAR categories and these are depicted in the bar chart, page 34. The 10 most requested categories were:



CLASSIFICATION OF DOCUMENTS DISSEMINATED  
BY STAR CATEGORIES

CLASSIFICATION



NUMBER OF DOCUMENTS  
1098 Documents disseminated from November 1, 1971  
through October 31, 1972

12 months ending October 1971 —  
12 months ending October 1972 -/-

Figure 11

<u>Category Number</u>	<u>Subject</u>	<u>Documents Forwarded</u>
21	Navigation	164
14	Instrumentation & Photography	108
05	Biotechnology	85
15	Machine elements & processes	58
04	Biosciences	56
13	Geophysics	56
18	Materials, Non-metallic	55
09	Electric equipment	42
12	Fluid mechanics	40
07	Communications	34

In the course of their review of current literature, applications engineers may find documents which they think will be of interest to present or potential clients. These documents, designated Selective Dissemination (SD) documents, are forwarded to the individual without specific request or charge. Of the total documents mailed out during this contract period, 82 were classified as SD documents.

#### SPECIAL STUDIES

Two documents of potential value to clients have been published by NC/STRC during the current contract period. *IN-PLANT AIR AND NOISE POLLUTION MONITORING: What the Occupational Health and Safety Act of 1970 Requires*, was prepared by Dr. L. K. Monteith, professor of electrical engineering at N. C. State University and consultant at NC/STRC. This report provides accurate, easily-understandable answers to questions of pollution monitoring applicable to business of every size; it also contains a list of monitoring equipment manufacturers. This report is currently being reprinted.

## *A STUDY OF COMPUTER TERMINALS FOR INFORMATION RETRIEVAL*

*APPLICATIONS* provides reference information on currently available computer terminals and is intended to provide the reader with sufficient background information to select an appropriate terminal for his particular application.

It is the work of W. Wayne Stargardt, an engineering student at Massachusetts Institute of Technology, employed by NC/STRC under the student intern program during summer vacation.

### LIBRARY SEARCH SERVICE

The Library Search Service (LSS), a refinement of the Graduate Student program of several years ago, was originally designed for graduate level and faculty research support. However, more and more undergraduates are taking advantage of this service offered through their university and/or departmental libraries. Here students can work directly with a librarian who has been specially trained by NC/STRC in search-writing techniques (thereby eliminating much of the expense incurred under the GSP when engineers met personally with each graduate student. The prepared searches are forwarded to NC/STRC for processing and returned to the librarian unevaluated and without documentation.

Although the LSS is now available in more libraries than previously, total usage has dropped somewhat. NC/STRC staff members attribute this largely to the general cutback in research funding by the federal government. At N.C. State University, for instance, graduate enrollment in the engineering school is 30% lower in the 1972-73 academic year than in 1971-72.

TABLE VII  
SERVICE STATISTICS

	1st Contract Quarter 1971				1972				2nd Contract Quarter				3rd Contract Quarter				4th Contract Quarter				TOTALS
	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.									
RETROSPECTIVE SEARCHES																					
INDUSTRIAL CLIENTS	39	30	15	19	19	18	21	15	29	30	11	12							865 T		
LIBRARY SEARCH SERVICE	14	14	12	18	33	22	6	14	9	9	8	10							258		
OTHER RDC'S	23	17	41	45	51	37	25	35	27	23	50	40							169		
IN-HOUSE*		1	9		5			5	2										414		
												2							24		
CURRENT AWARENESS																			582 T		
NC/STRC	16	28	24	37	38	38	38	49	20	81	36	66							471		
OTHER RDC'S	11	11	2	6	5	11	7	12	3	12	9	12							101		
TOTAL HITS																					
(NC/STRC INDUSTRIAL CLIENTS)	7,890	7,344	4,074	8,299	7,249	3,528	3,515	4,241	14,370	19,821	3,860	3,862							88,049		
ABSTRACTS OF RELEVANT HITS																					
(NC/STRC ONLY)	3,686	5,697	2,004	2,290	2,217	3,119	2,426	2,303	7,372	9,243	1,088	3,242							44,687		
DOCUMENTS ORDERED																					
NASA CATEGORIES	62	226	109	52	70	114	77	86	89	83	81	49							1,098		
OTHER	129	111	139	120	203	126	118	129	63	186	129	179							1,632		
Total	191	337	248	172	273	240	195	215	152	269	210	228							2,730		

\* Sample searches, background for special reports, etc.

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#### **IV. COMPUTERIZED INFORMATION RESOURCES AND ACTIVITIES**

##### **A. NC/STRC Search System**

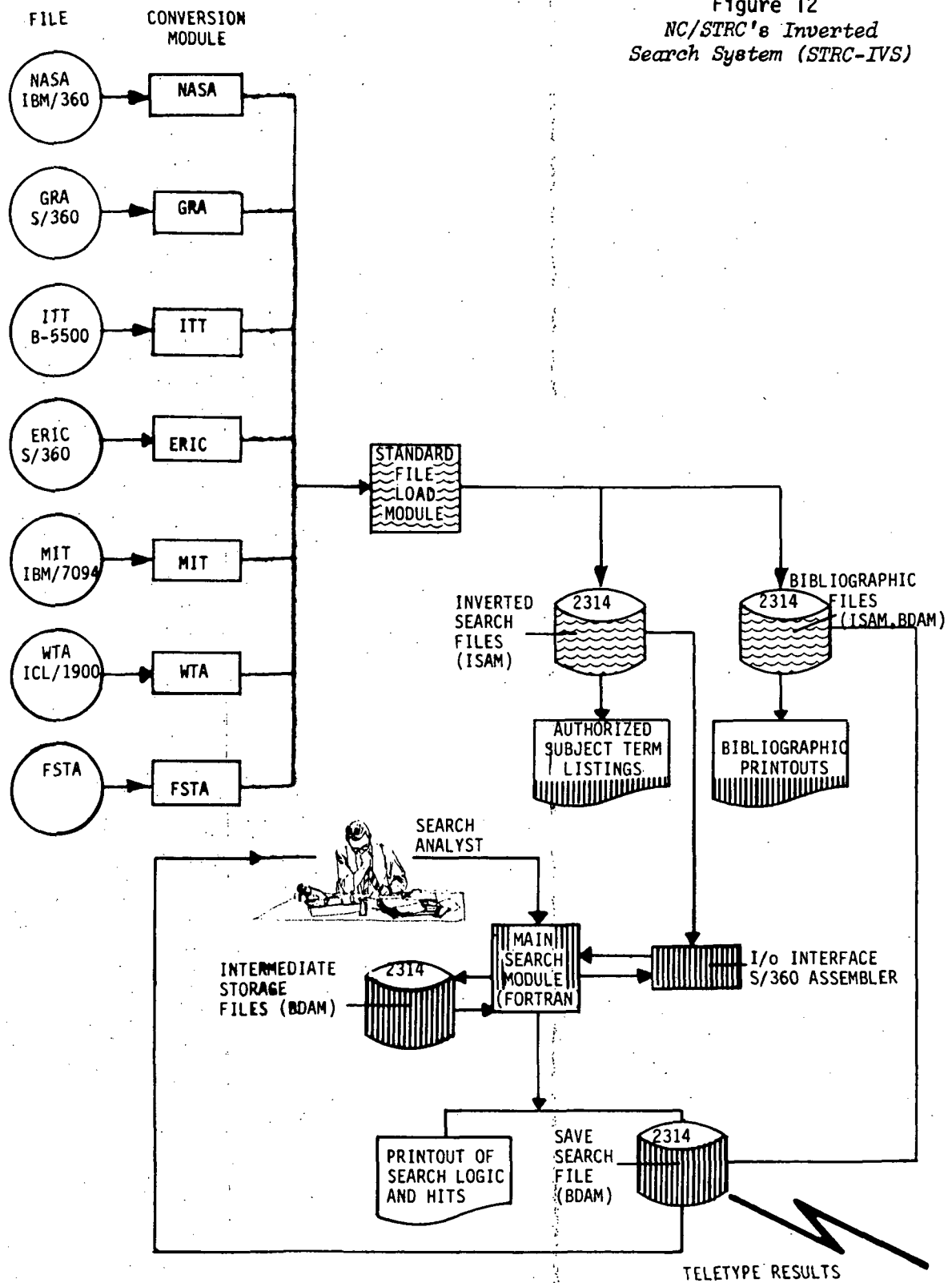
The NC/STRC inverted file search system (STRC-IVS) was designed and programmed in 1967 to take advantage of the available hardware at that time (an IBM System 360/Model 75 and Model 40 with direct access devices and large core) in searching the NASA document base (already some 300,000 unclassified documents at that early date). Since the data base was quite large but well indexed, and since we had a rather sophisticated set of hardware to work with, we chose to adopt a modified NASA STIMS design and process with tandem inverted and linear files. A systems flowchart is included as Figure 6, page 39.

Over the years, we have been able to process a number of other data bases in the same system with only a few modifications, i.e., file conversions to standard STRC format. The system has proven to be an extremely efficient mode of operation for both the large files such as NASA and GRA and the smaller files such as the textile files. A monthly check on the cost and performance of the STRC-IVS shows it to be an efficient method of processing searches.

NC/STRC is fortunate in having access to the computer facilities of the Triangle Universities Computation Center (TUCC), Exhibit V, which has always provided us with fairly advanced computer hardware. TUCC has recently acquired an IBM System 370/Model 165 with 2048K bytes of main storage, one 3330 disk facility, and two 2314 disk facilities. We were pleased to find that STRC-IVS ran even more efficiently on the faster CPU of the 165, so that our original design is still a good choice for the kinds of files NC/STRC is now processing.



Figure 12  
NC/STRC's Inverted  
Search System (STRC-IVS)





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## **B. Systems Developments in 1972**

It is appropriate at this point to discuss some of the systems developments of the past year. These include both improvements to the system and additions to the already large number of files that are computer-searchable at NC/STRC.

1. **Government Reports Announcements (GRA):** A detailed study of the indexing problems in the GRA file was performed and the results were recorded in a paper for the Spring 1972 meeting of the Association of Scientific Information Dissemination Centers (ASIDIC).
2. **Interactive Search Entry:** Programming was completed for a system to allow clerical personnel at NC/STRC to enter searches into the batch-search program interactively via the new Hazeltine 2000 CRT terminal. The new interactive search entry was designed to save clerical time and effort and to avoid problems that are inherent in standard key punch-card entry.
3. **Food Science and Technology Abstracts (FSTA):** The 1972 FSTA file was integrated into the NC/STRC search system and current-awareness searches were processed for clients throughout 1972. Negotiations were in process during the contract year with the Institute of Food Technologists (IFT) to make NC/STRC one of two national centers for searching FSTA. Plans were also made to acquire the FSTA retrospective file (1969-1971).

4. **World Textile Abstracts (WTA):** The retrospective WTA file of some 30,000 documents covering the time period 1970-1972 was added to the NC/STRC search system. Some of the programming was performed to the specifications of the Textile Information Users Council (TIUC), the major source of clients for textile information at NC/STRC.
5. **Educational Resources Information Center (ERIC) File:** Programming was done by NC/STRC staff members, in cooperation with professors in the Department of Education at North Carolina State University, to allow students to use interactive search entry via terminals at NCSU to perform ERIC searches on the STRC system.
6. **Air Pollution Abstracts Tapes:** A sample APA tape was processed experimentally into the STRC system. However, NC/STRC was never given permission by the Environmental Protection Agency to process the tapes on a production basis.
7. **NASA** - a full year of the new NASA-Cosati format was processed with very few problems thanks to NASA's quality control.
8. **Cost Accounting - Division of Natural and Economic Resources (N&ER):** NC/STRC provided programming support to N&ER in order to produce several cost-accounting reports. These reports are run on a monthly basis and the NC/STRC programming staff is responsible for seeing that the reports produced are both timely and accurate.

### **C. Future Systems Developments**

NC/STRC will continue to monitor the existing STRC-IVS and look for ways to improve the processing efficiency. Part of this includes keeping up with new software developments at other information processing facilities.

It is becoming apparent that the new trends toward non-indexing or machine indexing will force NC/STRC to develop a text-searching capability if we plan to search some of the other files available today. Throughout the next year, thorough studies will be made of the text processing systems now in production use.

The new interactive search entry system will be improved as much as possible to reduce clerical effort and error and to take full advantage of the capabilities of the Hazeltine's programmable screen and input editing.

### **D. Professional Activities**

1. American Society for Information Science (ASIS) Annual Meeting, November 7 - 11, 1971: Mrs. Williamson and Miss Bridenstine participated in the annual ASIS meeting held in Denver, Colorado. While in Denver, Mrs. Williamson accompanied Ted Brandhorst, Director of the ERIC Processing and Reference Facility, and Doug Price, Deputy Director, on a visit to the Information Retrieval Center of the Northern Colorado Educational Board of Cooperative Services.
2. American Society for Scientific Information Dissemination Centers (ASIDIC) Spring Meeting, March 20 - 21, 1972: Miss Bridenstine and Mrs. Williamson attended and Mrs. Williamson participated in the

program by giving a paper on the problems that had been encountered in the processing of the GRA tapes.

3. Textile Information Users Council (TIUC) Spring Meeting - April 19 - 20: Mrs. Williamson attended the Spring TIUC meeting in Gaithersburg, Maryland, and presented a report on the NC/STRC search services of interest to textile information users. While in Maryland, Mrs. Williamson also visited the National Agricultural Library on April 21.
4. ERIC Tape Users Conference - September 21 - 22: Mrs. Williamson attended the Fall ERIC tape users conference in Downingtown, Pennsylvania, and gave a presentation on the STRC/ERIC search services.
5. TIUC Fall Meeting - October 12 - 12: Mrs. Williamson attended the Fall meeting of the Textile Information Users Council in Asheville, North Carolina, and gave a report on NC/STRC processing of the WTA file.
6. ASIS Annual Meeting - October 23 - 26: Miss Bridenstine and Mrs. Williamson attended the annual ASIS meeting in Washington, D. C. While in the Washington area, Miss Bridenstine and Mrs. Williamson also participated in a GRA tape users meeting at the National Technical Information Services.

## V. SPECIAL EVENTS

In the summer of 1971, representatives of the N. C. State Fair asked NC/STRC for assistance in securing an exhibit of NASA hardware for the '71 Fair. A request was then made through the Special Events division in Washington, D. C., but it was too late at that time to schedule any item of interest and the matter was dropped.

Immediately following the '71 Fair, however, an informal meeting between NC/STRC personnel and State Fair officials resulted in plans for an exhibit of not less than 800 sq. ft. for the 1972 Fair. This space would be donated by the Fair as part of its education program.

In January 1972, the first formal planning session was held at NASA-Langley Research Center in Hampton, Virginia. Present at the session were representatives from NC/STRC, the State Fair, and NASA-Langley's Offices of Public Affairs and Technology Utilization. By this time, responsibility for such events had been decentralized and Headquarters in Washington no longer scheduled exhibit items. Instead, the various NASA centers such as Langley assumed responsibility for events occurring within their geographical area. The Office of Public Affairs at Langley, therefore, was designated as the contact point for this particular project.

President Nixon's address on the importance of technology utilization in the years ahead was taken as the keynote of the exhibit. All participants agreed that the central theme would be the benefits accruing to mankind from the space program, although artifacts such as a lunar rover and an astronaut's suit could be used to gain attention.

Enthusiasm for the project bounded and rebounded between NC/STRC, the State Fair, and Langley Research Center over a period of several months and many meetings. By March, NASA was verbally committed to supporting the event, although with some reservations. Unresolved issues included security precautions, the reception such an exhibit could expect in a state fair atmosphere, and the capabilities of the joint sponsors to stage an event of the magnitude this one was by then assuming.

In July 1972, Mr. E. H. Maher, Office of the Assistant Director for Administration at Langley, visited NC/STRC and met with heads of all the participating agencies. At this meeting, final plans and commitments were made by each organization and the official "go ahead" given. From the proposed 800 sq. ft., the exhibit had now evolved into one covering more than 10,000 sq. ft. - the largest educational exhibit ever presented at the North Carolina State Fair.

#### PARTICIPANTS

"Returns from the Future" represented the combined efforts of many agencies, both state and federal, over many months. NC/STRC, in its capacity as an information center for NASA, served as the coordinating agency and was directly responsible for development of the theme, procurement of exhibits, communication between participants, and maintenance of a work schedule.

The project would have been impossible without the assistance of many organizations. For their enthusiastic cooperation, NC/STRC wishes to express its appreciation to the following.

### N. C. State Fair

By providing the physical facilities needed to house such a large exhibit, Mr. A. K. Pitzer, fair manager, made the project possible. In addition, the Fair made available security guards, electrical power, equipment and manpower to handle the exhibits, and 1,001 last-minute items ranging from good advice to Redi-lite barricades for the Apollo 12 command module van.

A special note of appreciation should be extended to Mr. Bob Wills, in charge of Fair promotion, who originated the idea and master-minded all promotional efforts. The effectiveness of his work is attested to by the more than 250,000 people who visited the exhibit (the largest attendance on record at the Fair for a single exhibit) and by the representative clippings shown in Appendix B.

### The Morehead Planetarium, University of North Carolina at Chapel Hill

Director A. F. Jenzano and his assistant, Mr. Richard Knapp, provided invaluable assistance in planning the overall lay-out. In addition, they designed and their staff fabricated the lunarscape base for the moon rover and the astronaut's suit, along with a scale model of the solar system which was suspended from the dome. The Planetarium also aided the promotional program by including information on the exhibit in two 30,000-piece mailings to school children and teachers.

### N. C. Department of Natural and Economic Resources

Through its Commerce and Industry division, contact was made with companies in North Carolina which have or still are participating in the space program. C&I representatives secured the items which later made up most of the exhibit entitled "Bringing the Space Age Home." The Office of Industrial, Tourist, and Community Resources also hosted the reception for honored guests which followed the opening ceremonies.

### N. C. State Highway Patrol

An official escort was provided by the Patrol for the two over-sized vehicles transporting the Apollo 12 command module and the full-scale CSM mock-up.



#### N. C. State Highway Commission

The Highway Commission graciously issued permits for the two oversized vans mentioned above, coordinating the routes with the requirements of the Virginia Department of Highways.

Mr. Lloyd Young, superintendent of equipment, also made available a crane, operator, and foreman to facilitate unloading, placement, and then the re-loading, of the full-scale Cii mock-up.

#### N. C. Department of Public Instruction

The NASA exhibit was heavily publicized through summer science workshops for teachers and through departmental publications. Students in many classes were given extra credit for attending the exhibit; a number of classes attended as a group.

#### National Aeronautics and Space Administration

NASA served as a joint sponsor in this event; however, special recognition should be given to those offices and individuals who supplied the extra encouragement, expertise, and cooperation which took it from "proposed" to "accomplished."

##### Langley Research Center, Hampton, Virginia

Almost the entire burden of supplying the display items for this exhibit fell on NASA-Langley. NC/STRC is particularly indebted to Mr. E. M. Cortwright, director, who made available NASA personnel and materials; Mr. Axel Mattson and Mr. E. H. Maher, Office of Center Development and External Affairs, for their encouragement, advice, and expertise; Mr. John Samos, Technology Utilization Officer; Mr. Hal Mahrens, for the two spacemobiles manned by Messrs. James Miracle and Ted Stohr; to the Office of Public Affairs for promotional materials, coordination, assistance in fulfilling legal requirements, and to Mr. Maurice Peter for personally expediting shipments, overseeing erection of displays, and supervising tear-down and reshipment.

##### Rosman Tracking Station, Rosman, N. C.

Mr. James C. Jackson, director, responded to a request for pictures and display material by introducing us to Mr. Collota at Goddard Space Flight Center who immediately offered assistance.

**Goddard Space Flight Center, Greenbelt, Md.**

During the final hectic days before the grand opening, several important display items "fell by the wayside." Mr. George Collota made available three large and timely displays which rounded out the overall exhibit both physically and in coverage. We are also very appreciative of the expert assistance of Mr. Frank Hickman from Blair, Inc., who performed many chores above and beyond his contract requirements.

**Lewis Research Center, Cleveland, Ohio**

Mr. Harrison Allen, Office of Public Affairs, arranged for shipment of additional exhibits and provided information and advice on the availability of others.

**Marshall Space Flight Center, Huntsville, Alabama  
Manned Spacecraft Center, Houston, Texas**

Both centers provided display items which added to the overall theme.

**The Smithsonian Institution, Washington, D. C.**

Recognizing the historical value and pricelessness of each space artifact, we are especially grateful to Mr. F. C. Durant, III, assistant director of Astronautics, National Air and Space Museum, for permitting us to exhibit the suit of Astronaut Alan Bean, as well as the many other items used in the exhibit.

**General Electric Company, Outdoor Lighting Division - Hendersonville, N. C.**

GE was most cooperative in supplying engineering assistance and equipment to satisfy lighting requirements.

Many individuals, with no real involvement in the exhibit, became so interested and enthused that they ended in donating their time and services in order to be a part of "the biggest thing that's happened in North Carolina." To them, we extend our sincere appreciation.

## FACILITIES

The N. C. State Fair occupies permanent quarters within close proximity to the Raleigh Beltline and adjacent to property belonging to N. C. State University and the N. C. State High Commission's equipment depot. The area to be used was black-topped and afforded ample space for trucks.

Mr. A. K. Pitzer Fair manager, made available for this project the use of a geodesic dome measuring 120 ft. in diameter and approximately 48 ft. in height at its apex. This dome was located adjacent to the main gate into the Fairgrounds in the education section of the Fair.

Erection of the dome was begun on September 14 and finished on September 27, a total of 13 days after the concrete footings were poured. Advantages of this type of structure for our purposes included nearly 10,000 sq. ft. of open floor space, unencumbered heights ranging from 10' to 48', a dark interior which permitted special lighting effects, and easy access to and movement within the structure. Liabilities of the dome included inability to secure it against intruders and a susceptibility to dampness.

State Fair officials made available to NC/STRC the use of a forklift and its operator, the services of their electrician, the assistance of their maintenance and carpentry shops, storage for crates, and secured the use of a crane with its operator and foreman from the Highway Commission. This crane was used to lift the full-scale Apollo Command Service Module from its flatbed trailer and deposit it on its stand inside the dome.

## EXHIBITS

An effort was made to balance the dramatic and exciting artifacts from the Apollo missions with educational displays, bringing to the attention of viewers the other areas of NASA concern. In this latter category, we obtained the Technology Utilization items such as the microminiaturization display from Lewis Research Center and the Fire Safety display from TU Headquarters. Many of the items requested in the TU category were not available, especially those in the area of biomedical applications. This was unfortunate inasmuch as we had had many inquiries from medical groups concerning such exhibits. However the final tally represented many aspects of NASA research and activity of which the average citizen is not aware.

### DESCRIPTION OF EXHIBITS

Listed below are the major display items provided by NASA, the source supplying each item, and the insurance value placed on each:

Vertical Assembly Building	Langley	\$ 8,000
Full-scale Apollo Command module prepared for launch	Langley	50,000
NASA Story	Langley	9,400
Foods for Spaceflight	Houston	1,000
Lunar Roving Vehicle	Huntsville-Langley	20,000
GE Biosatellite	Langley	25,000
1/3-Scale Apollo Lunar Module	Langley	7,500
Research, Foundation for the Future	Langley	5,000
Long Haul Aircraft for 1980's	Langley	10,000
IEEE Exhibit	Langley	5,000
Saturn V Launch Vehicle	Langley	3,500
Rosman Station Exhibit	Rosman-Goddard	2,500
OA0 Exhibit	Goddard	25,000
1970-1980, the Second Decade	Goddard	12,000
Microminiaturization Display	Lewis	6,500
Turbofan Jet Engine Display	Langley	10,000

Parachute	Houston	\$ 5,000
Man on the Moon	Houston	2,500
Listen Post	Langley	5,000
Airport Community Display	Langley	38,000
Medical Rehabilitation Display	Langley	5,000

The North Carolina exhibit, insured for \$100,000, was related to but a separate part of the overall exhibit. The original intent was to show this state's involvement in the space program through its industries, its researchers, and its history. From Kitty Hawk to Rosman Tracking Station, from ESB batteries to Burlington textiles, North Carolina has been a part of the space story.

Design and fabrication of this display was the responsibility of a faculty member at the N. C. State University School of Design. Because we did not know, initially, the size, quantity, or type of items which would be included in this section, it was difficult to establish a budget, allot floor space, or even develop a basic concept. Many NASA contractors had been identified earlier through the Defense Material Control Center in Atlanta, Ga. Some sub-contractors were known to NC/STRC's engineering staff through the TU program, and most of the university researchers were known to NC/STRC personnel either through the Library Search Service or through the research grants program administered by the Board of Science and Technology.

Over the signature of Gov. Scott, a letter was sent to all companies and researchers identified, urging their participation in the exhibit. Many were enthusiastic and cooperative; however, an equal number were reluctant and two did not take any part at all in the project. We have been unable

to find out whether this was due to the "popcorn and peanuts" stigma of a Fair, or whether they mistakenly felt that they could not afford an exhibit similar to those used in trade shows. One company, after repeated calls, finally asked us to quit bothering them and offered no explanation for their attitude.

The final size and shape of the North Carolina exhibit was based on two factors: (1) the floor space required by the NASA exhibits, and (2) the type of items to be included in the industrial display. Many of the items could be hung on the backdrop or exhibited "as is" but most of them required some measure of security from inquisitive hands. To enclose these items, Prof. Fred Eichenberger designed large cubes lined with felt and covered with plexiglas. The cubes were supported by heavy cardboard tubes sprayed with foam and painted.

The backdrop for the display consisted of risers which were loaned by the State Fair. These were turned on end, covered with corrugate which had been treated with a flame-retardant liquid, and placed in a free-form pattern around approximately one-quarter of the outer perimeter of the dome, forming a wall 8 ft. high. The display boxes were placed in front of this wall at irregular intervals and at differing heights.

The overall theme of this section was "Bringing the Space Age Home." All texts for pictures and display articles were kept very simple and endeavored to convey only four items of information:

- (1) what the item was
- (2) what part it played in the space program
- (3) the name of the providing company or research institution
- (4) the location of the company or institution

One of the most memorable and satisfying experiences during the entire week of the Fair was the reaction of one lady to her employer's display - *precision resistors from Shallcross Manufacturing Co., in Selma, N. C.* She recognized the resistors immediately, called over all her friends and proceeded to give a lecture on how they are made. She had been working at Shallcross for years but had known neither what she was making nor its function. Her excitement and delight were contagious and accomplished more for the exhibit than any lecturer could have done.

### SECURITY

Because of the carnival-like atmosphere commonly associated with Fairs, NASA officials were understandably concerned that adequate security precautions be taken to assure the safety of exhibits, especially the historic artifacts such as Alan Bean's space suit, the moon rock, and the Apollo 12 Command Module.

Prior to the official opening of the Fair on Friday, October 13, the Fairgrounds were open to anyone. It soon became necessary to assign a full-time security guard to the geodesic dome at night to keep out unauthorized visitors. These guards, supplied by the State Fair, were on duty every night from the time crates were unpacked until the last item had been returned. In addition,

the moon rock was kept in the safe in the Administrative offices of the Fair from closing time each night until the official opening time each day. An armed escort was provided by the Fair for the trips to and from the offices.

Honor guards on duty during visiting hours were supplied by the Marine Corps Reserves and the U. S. Army Reserves. An MP was on constant duty in the Apollo 12 van; two marines and one soldier were on duty inside the dome at all times. Each contingent was on duty for six hours.

### PROMOTION

Responsibility for promotion of this event was assumed by the State Fair. Much of the annual Fair promotion is handled by an advertising agency and for the 1972 Fair all promotion highlighted the NASA exhibit. This included billboards, paid advertising in newspapers, on radio and television.

Free promotion was provided by a number of state agencies in their house organs. The State Highway Commission, for instance, featured the NASA exhibit in its monthly publication entitled "Roadways," as did the State Planning Commission, Department of Public Instruction, and the Morehead Planetarium.

During the four weeks immediately preceding the Fair's opening, the Commissioner of Agriculture and an aide tour the state on behalf of the Fair. Either singly or jointly, they appear on radio and television, speak at civic and grange meetings. During 1972, they devoted about 90% of their speaking time to the NASA exhibit, using small models of spacecraft to illustrate their



talks. The map in Appendix B, page 6, shows the coverage Commissioner Graham and his aide secured for the exhibit.

The exhibit was also featured in the "Mini-Page," a four-page tabloid-format insert for children originating in the Sunday edition of the Raleigh News & Observer. (The insert is now syndicated in 164 newspapers.) NC/STRC promoted the exhibit in two issues of its own monthly Technical Bulletin.

All companies and organizations participating in the North Carolina exhibit were contacted about items in their own in-house publications. However, not one responded and it is not known if any mentioned the exhibit. A dignitary from each company was invited to the opening ceremonies and reception which followed. Each one attending was given a small memento suitably inscribed. Those not attending were given one when their company's exhibit was returned later.

NC/STRC's role in promotion was to provide the technical information on each display item, plus photographs. We wish to express appreciation to NASA for supplying the latter.

Perhaps one of the most effective promotional efforts was a special advance preview of the exhibit for members of the news media. Invitations to attend and bring their families were sent to 1,000 members of the press, radio, television, and magazine or other publication staffs across the state. Mr. James Strates, owner-operator of the Strates Shows, graciously donated rides for small children on the midway during the preview period. Other concessionnaires donated cold drinks and hot coffee to our guests.

## ATTENDANCE

The N. C. State Fair normally draws between 450,000 and 500,000 people, depending largely on the weather. The 1972 Fair enjoyed mostly good weather and attendance topped 581,000 paid admittance\*. All senior citizens (those over age 60) and all children under 12 are admitted free. It is estimated that these two groups, plus approximately 10,000 workers and exhibitors, carried the grand total on the Fairgrounds during the 9-day event to more than 600,000 people.

It was very difficult to get an accurate estimate of the number attending the NASA exhibit. However, an average daily attendance was calculated using a number of different methods, and for the nine days the total number of visitors was estimated at 260,000. Those visiting the Apollo 12 Command Module were estimated at 40,000. Each morning, a line of people waiting to see the Apollo 12 CM would begin to form about half an hour before opening. It would continue throughout the day until the van was closed at night. At one spot check, visitors reported waiting in line for 1-1/2 hours; the shortest time reported was 20 minutes.

On the first Saturday of the Fair, more than 33,000 people visited the dome. Many reported that it was too crowded to see any of the exhibits and they came back at a later date.

A number of people, many of them senior citizens, came back to the exhibit several times and stayed an hour or more each time. Several told NC/STRC hosts that it was the first time anything to do with space or aeronautics was made clear to them.

\*Based on daily gate receipts

The Space Science demonstrations were very successful and, again, the older people were even more interested than those under age 20. Mr. James Miracle and Mr. Ted Stohr, who conducted the 20-minute sessions, did an excellent job of tailoring their talks to the audience of the moment. Two classes from the Governor Morehead School for the Blind were especially interested and responsive.

A comment on the effectiveness of these demonstrations was made in a letter to NC/STRC from Mr. Mitchell Simon, assistant director of the News Bureau, University of North Carolina:

"Congratulations on that splendid space show at the Fair. One Saturday I had the pleasure of hearing Jim Miracle's lecture - such an easy conversational manner of explaining science to people - he's great."

Following the Fair, Mr. Miracle reported attendance at the demonstrations as follows:

Number of presentations (20 minutes each)	123
Number of persons attending	27,800
Number of teachers contacted for kits	300
Handout material distributed (pieces)	29,000

Following the Fair exhibit, NC/STRC has been contacted by several organizations and businesses for information on possible future displays. Although several are being investigated, none are of comparable size to the State Fair.

**Appendix A**  
**Case History**

## CASE No. 125 - Update

Recent federal regulations on noise pollution levels permissible in industry focussed attention on a major problem for furniture manufacturers - the noise created by cutting tools which was extremely high, often surpassing standards set by the new guidelines.

As part of its services to industry, NC/STRC initiated in-depth research into the problem. Dr. Franklin Hart, professor of mechanical and aerospace engineering and director of the Center for Acoustical Studies at N. C. State University, had become interested in the general topic of noise by studying supersonic airplane noise as a faculty summer intern at NASA-Langley Research Center. In tackling the furniture manufacturers' problem, Dr. Hart developed an analytical model which related the noise produced to the rate of change of cut and the amount of wood removed per cut. The model showed that if one slanted the cutting blades, the rate of change of cut was greatly reduced. Thus, by using slanted blades and more blades, one could reduce the noise to tolerable levels.

A planer manufacturer became interested in the work and has produced a low-noise cutter which employs segmented knives with the segments displaced relative to one another to form a helical cutter. The number of knives was not increased. Unfortunately, the production cost is not economically feasible and the manufacturer has not advertised the cutter.

Interest in the research project has increased, however, and Dr. Hart is continuing his investigation with financial support from SFMA and Newman Machine Company. Presently, he is looking into the possibility of retrofitting planers with sound-absorbing enclosures.

## **Appendix B**

### **Exhibits**

# WORK ORDER REQUEST FORM

Please fill in the following information:

Name of Client: \_\_\_\_\_

Address: \_\_\_\_\_

City, State, Zip: \_\_\_\_\_

Individual to Contact: \_\_\_\_\_ Telephone: \_\_\_\_\_

Engineer: \_\_\_\_\_ Delivery Date: \_\_\_\_\_

Type of Client: \_\_\_\_\_ SIC Code: \_\_\_\_\_ P.O.# \_\_\_\_\_

Originating Source: \_\_\_\_\_

Service to be Provided: \_\_\_\_\_

Price: \$ \_\_\_\_\_

Please check appropriate classification:

Size: ☐ More than 500 ☐ Less than 500 employees

☐ Manufacturing or Production

☐ Commercial R&D, Engineering, Consulting or Technical  
Information

☐ Federal Government

☐ State or Local Government

☐ University or Research Firm engaged in Educational  
Activities



NORTH CAROLINA SCIENCE & TECHNOLOGY RESEARCH CENTER WORK ORDER					
Name of Company/Organization:		Type of Client: <input type="checkbox"/> Annual <input type="checkbox"/> Demand <input type="checkbox"/> Wholesale <input type="checkbox"/> University		Client Number:	Work Order Number:
Address:					
City, State: _____ Zip _____		Amount of Subscription:		SIC Code:	
Individual to Contact:	Telephone Number:			Originating source for Work Order:	
Applications Engineer Assigned to this Client:		Special Instructions:		Purchase Order or Authorizing Doc.: <input type="checkbox"/> Attached <input type="checkbox"/> Pending <input type="checkbox"/> Other	
Delivery Date:				This Work Order reported on S/A Report Number:	
Service to be provided: (Search, Documents, Reproduction, etc.)					
Date Issued:	Date Completed:			Authorized Approval:	

EXHIBIT B-2

REQUEST FOR MACHINE SEARCH NUMBER                     

COMPANY CODE: \_\_\_\_\_ ENGINEER: \_\_\_\_\_ DATE: \_\_\_\_\_ TIME: \_\_\_\_\_

SEARCH TITLE: \_\_\_\_\_

OUTPUT OPTIONS: \* ACC, CIT, NOC, TER, WEI.

SORT OPTIONS: \* ACC, CAT, CON, COR, COS, PER, REP, SER, WEI

MINIMUM WEIGHT: \_\_\_\_\_ HIT LIMIT: \_\_\_\_\_ OTHER: \_\_\_\_\_

STATEMENT OF PROBLEM: \_\_\_\_\_

## DESCRIPTIVE TERMS

[illegible]

LOGIC: \_\_\_\_\_

\* CIRCLE OPTIONS DESIRED.

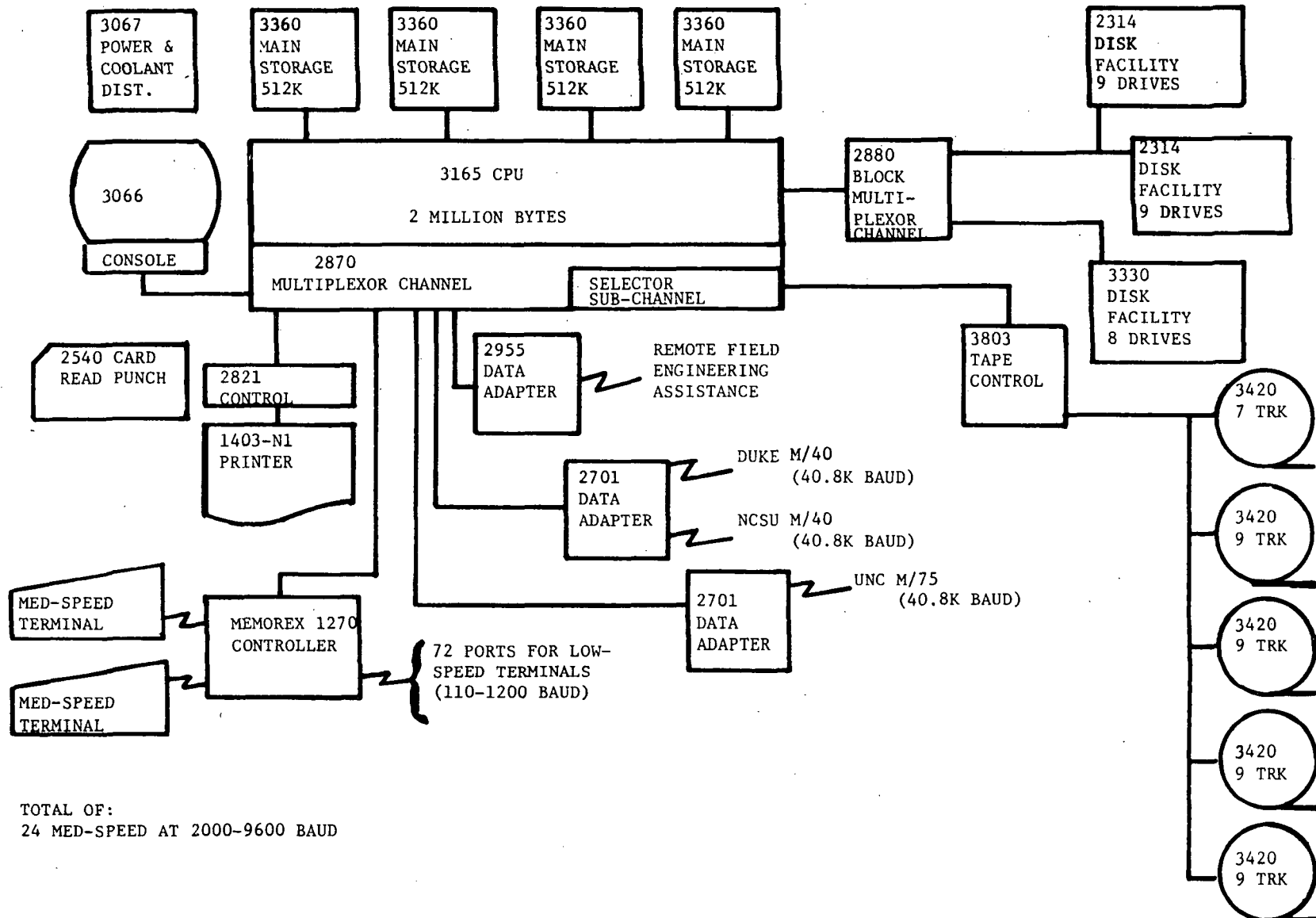
Document Service					
<u>Sources</u>	Quarter ending:				<u>TOTALS</u>
	<u>1/31/73</u>	<u>4/30/72</u>	<u>7/31/72</u>	<u>10/31/72</u>	
Documents reproduced at NC/STRC:					
<i>By Xerox</i>	163	134	68	189	588
<i>From microfiche</i>	4	2	7	7	20
<i>Microfiche-to-microfiche</i>	0	7	14	16	37
NC/STRC hardcopy stock	39	42	72	27	180
Regular sources:					
<i>NTIS hard copy</i>	190	174	148	139	651
" <i>microfiche</i>	4	17	0	1	22
<i>ARAC hard copy</i>	94	88	85	126	393
" <i>microfiche</i>	0	0	0	0	0
Cosmic	0	1	1	0	2
Other miscellaneous sources	<u>282</u>	<u>221</u>	<u>168</u>	<u>225</u>	<u>896</u>
TOTALS	776	685	562	707	2,730

TRIANGLE UNIVERSITIES COMPUTATION CENTER

RESEARCH TRIANGLE PARK, NORTH CAROLINA

IBM SYSTEM/370 HARDWARE CONFIGURATION

October 1, 1972



TOTAL OF:  
24 MED-SPEED AT 2000-9600 BAUD

# Largest space exhibit ever just one of fair offerings

**Apollo  
Display  
N. C.**

By DAVE BRADLEY  
Times staff writer

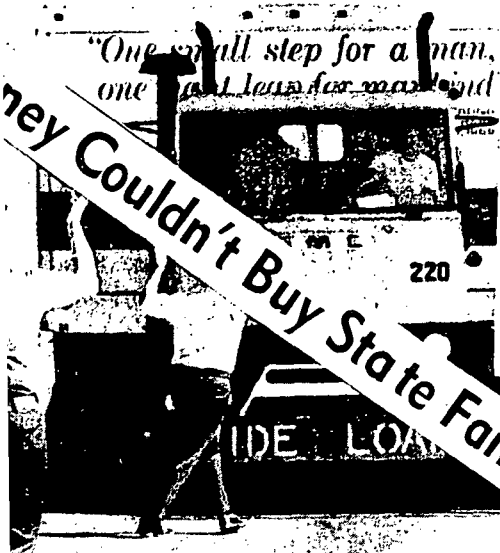
The largest space exhibit ever presented—rover and moon rock, will highlight the State Fair here Oct. 13-21.  
About a half million day event at the fair, according to the fair board.

**Includes Apollo 12 Module**

**State Fair To Feature  
Priceless Space Exhibit**

**Moon**

RALEIGH - In addition to the Apollo 12 module, the fair will feature a display of moon rocks, a lunar rover, and a variety of other space-related exhibits. The fair is expected to attract a large number of visitors, particularly those interested in space exploration.



A trailer truck carrying the Apollo 12 module from the Apollo 12 mission is seen on its way through a toll gate in Va. on I-85 Tuesday. The module at carried Neil Armstrong home after the first moon walk July 20, 1969 and en route to the North Carolina State Fair in Raleigh where it will be on display at "NASA Exhibit" October 13-21. (Telephoto)

after the first moon walk July 20, 1969 and en route to the North Carolina State Fair in Raleigh where it will be on display at "NASA Exhibit" October 13-21. (Telephoto)

**ns From The Future  
d For State Fair**

**on hardware on display**

ing view moon mission hardware  
e command modules that have circled  
around the earth. Also included in the  
replica of the entire solar system  
will be placed into the exhibit.

**Without N.C., Would Man Have Reached Moon**

North Carolina would feel those acts are too tough to follow. North Carolina industries have shared in achievements by manufacturing a polycrystalline silicon wafer, a space watch, and a space toilet. You feel proud and a little surprised by there being an important part in the (astronaut) how ever would the astronaut talk out at Chemtech Research Triangle Park have a table for astronauts to use.

**State Fair  
exhibits  
Apollo**



EXHIBIT B-6

**NCST  
spons  
exhi**

The venture is a co-sponsorship of the North Carolina Science and Technology Fair and the State Fair and the largest space-educational exhibit ever presented. It will be presented in a 120 foot dome in square feet of exhibit space.

## Another lift off

Apollo 12 Command Module lifts off again, this time at the N. C. State Fairgrounds, where it will be on display during the fair in the largest space exhibit ever assembled, Oct. 13

to 21. The space module will be displayed in a 120 foot dome and an astronaut's suit will be on display in the exhibit.

**Apollo 12 At State Fair**

RALEIGH - The largest space exhibit ever assembled on display at the North Carolina State Fair, gives you the impression that without North Carolina's industries the space program would never have left Earth. Exhibited at the fairgrounds in the largest geodesic dome ever built, according to the press invitation is a space-oriented exhibit designed to obliterate all the questions you have about space travel.

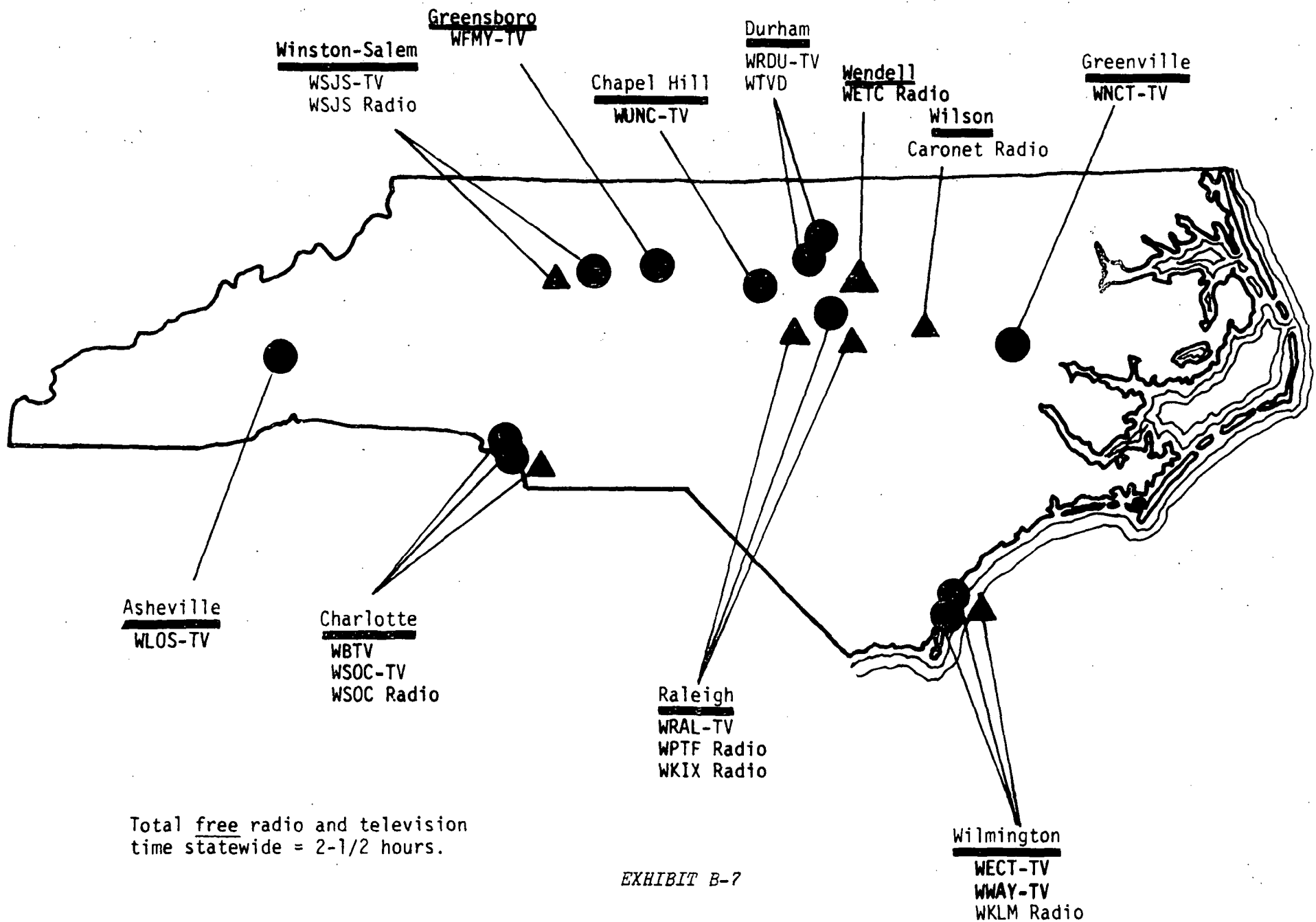


EXHIBIT B-7

**Appendix C**  
**Trips, Visits, and Meetings**

## VISITS, TRIPS, AND MEETINGS

November 5	Doris Schroeder presided at the State Public Information Officer's meeting in Raleigh.
November 7 - 11	Mary Ann Williamson and Mason Bridenstine attended the annual meeting of the American Society for Information Science held in Denver, Colorado.
November 10	John L. Lewis of D. E. Roby and Associates and David A. Watson of Pennsylvania Air Pollution visited NC/STRC to obtain information on our services.
November 10	P. J. Chenery, director, spoke at the IEEE Symposium in Greensboro, N. C.
November 11	Mrs. Williamson visited the Information Retrieval Center of the Northern Colorado Educational Board of Cooperative Services (NCEBOCS)
November 16	A 31-member Chamber of Commerce group from Lawrence, Kansas, visited the Center. Mr. Chenery conducted a briefing on the Research Triangle Park and NC/STRC, followed by a question and answer period.
November 22	J. Ralph McNeil of N. C. Water and Air Resources visited with Leon Neal, applications engineer.
November 29	Mr. Chenery represented the State of North Carolina at the Southern Interstate Nuclear Board meeting in Atlanta, Georgia.
December 6	Miss Becky Walker and Dr. F. O. Smetana, assistant director, spoke to a Home Economics seminar on the University of North Carolina - Greensboro campus on research techniques and the use of computerized retrieval.
December 14	Mr. Benito Kodijat, Chairman for Institute Matters, and Dr. Sumantri, Deputy Chairman for Technology, both of Indonesia, visited NC/STRC to study operations.
January 14	Six representatives from R. J. Reynolds Company, Winston-Salem, visited NC/STRC to talk with A. W. Lockwood, chemical engineer.



<b>January 17 - 18</b>	<b>Mr. Chenery attended the Action Counsel of Regional Dissemination Directors meeting at Ames Research Center, California.</b>
<b>January 18 - 19</b>	<b>Mrs. Schroeder, accompanied by two N. C. State Fair representatives, visited the NASA-Langley Research Center to discuss the NASA exhibit for the 1972 N. C. State Fair.</b>
<b>January 25</b>	<b>The reference librarian at D. H. Hill Library, North Carolina State University, visited NC/STRC to learn search writing.</b>
<b>January 25</b>	<b>Mr. Chenery attended the annual science panel meeting of the House Committee on Science and Astronautics in Washington, D. C.</b>
<b>January 27</b>	<b>The meeting of the ad hoc group on Technology Transfer in Washington, D. C. was attended by Mr. Chenery.</b>
<b>February 3</b>	<b>P. J. Chenery and J. Graves Vann attended the meeting of the N. C. Council on Managerial and Technical Services in Raleigh. Mr. Chenery served as a panel member.</b>
<b>February 3 - 4</b>	<b>Mrs. Schroeder attended the International Association of Business Communicators' workshop in Winston-Salem, N. C.</b>
<b>February 9</b>	<b>The Future Business Leaders' Club from Conly High School, Greenville, N. C. visited NC/STRC to explore computerized information retrieval in business and commerce.</b>
<b>February 10</b>	<b>Mr. Chenery spoke on NC/STRC services at a meeting of the N. C. section of American Society for Metals held in Raleigh.</b>
<b>February 11</b>	<b>Mrs. Schroeder presided at the monthly meeting of the State Public Information Officers' Association in Raleigh, leading a panel discussion on the state's human resources programs.</b>
<b>February 15</b>	<b>James N. Clingan, Information Handling Services, Arlington, Virginia, visited NC/STRC.</b>

**February 15 - 17**

Mr. Chenery represented North Carolina at a meeting at the White House, Washington, D. C., called by Dr. Edward E. David, Jr., Science Advisor to President Nixon.

**February 16**

Dr. R. Halig, Duke Medical Center; Mr. Paul Childers, N. C. State Board of Health; Mr. Tom McSwain, N. C. State Bureau of Investigation; Mr. Steve Reeves, Memorial Hospital in Chapel Hill; visited NC/STRC to discuss the potential value of the Infrared Spectral Information System to their respective laboratories, especially in the area of poison identification.

**February 16 - 17**

Mrs. Schroeder and Mr. Crawford visited NASA-Langley Research Center to firm up plans for the 1972 State Fair exhibit.

**February 17**

Miss Barbara Wonnacott, School of Library Science at the University of North Carolina visited NC/STRC for research on computerized search services in libraries for her graduate studies.

**February 24**

Mr. Chenery spoke on NC/STRC services to 500 employees of Western Electric at the company's Guilford Center. Mr. J. Graves Vann and Mr. T. R. Potter, applications engineers, accompanied Mr. Chenery.

**March 1**

Mrs. Williamson, Miss Bridenstine, and Mr. Neal visited the Air Pollution Technology Information Center to discuss the possibility of access to the APTIC abstract tapes.

**March 9**

Mr. Chenery attended the Program Committee meeting, National Science Conference in Washington, D. C.

**March 13**

Dr. Robert Work, director of textile research at N. C. State University, and two of his faculty members visited NC/STRC.

**March 13**

Five representatives from the Research and Information Unit of the N. C. Department of Public Instruction visited NC/STRC.

**March 16**

Seven representatives from Appalachian State University at Boone, N. C. visited NC/STRC.

<b>March 19 - 21</b>	<b>Mr. Chenery was elected president of the Association of Science Information Dissemination Centers (ASIDIC) at the group's meeting in Atlanta, Georgia. Mrs. Williamson and Miss Bridenstine attended the meeting also.</b>
<b>March 20 - 21</b>	<b>Miss Walker and Mrs. Schroeder attended the public information seminar sponsored by the Institute of Government, University of North Carolina at Chapel Hill.</b>
<b>March 21</b>	<b>A delegation of five Bulgarians, headed by Prof. B. L. Sendov, Dean of the Faculty of Mathematics, University of Sofia, visited NC/STRC to discuss the use of computers in information retrieval.</b>
<b>March 23, 30</b>	<b>Mr. Neal attended a seminar on solid wastes held at the University of North Carolina.</b>
<b>March 29</b>	<b>Dr. William F. McClure of N. C. State University visited NC/STRC to obtain assistance in establishing and searching a file under development by the American Society of Agricultural Engineers.</b>
<b>March 30</b>	<b>Mr. Vann attended the Conference on Sputtering and Ion Plating held at Lewis Research Center, Cleveland Ohio.</b>
<b>April 4</b>	<b>Mr. Chenery attended the executive committee meeting of the National Governors' Council on Science and Technology, Washington, D. C.</b>
<b>April 5</b>	<b>Mr. Edward Tyczkowski of Beaunit Fibers visited NC/STRC.</b>
<b>April 5</b>	<b>Miss Walker spoke to the N. C. Chapter, Special Libraries Association in Raleigh.</b>
<b>April 5 - 6</b>	<b>Mr. Chenery was a speaker for the American Society for Engineering Education meeting in Knoxville, Tennessee.</b>
<b>April 13</b>	<b>Messrs. Bruce Ryder and Robert L. Masden of the State Council of Higher Education of Virginia visited NC/STRC.</b>

April 13	Mr. Neal attended a seminar at N. C. State University entitled "Crashworthiness - Safety through Automotive Design."
April 19	The Technology Librarian, Old Dominion University in Virginia, visited NC/STRC to learn search writing techniques.
April 19 - 20	Mr. Crawford and Mrs. Schroeder, accompanied by Prof. Fred Eichenberger, N. C. State University School of Design; Mr. M. Oliver, Commerce and Industry Division; and Mr. Richard Knapp, assistant director of the Morehead Planetarium, visited NASA-Langley Research Center to confirm plans for the NASA-State Fair exhibit.
April 19 - 23	Mr. Chenery represented North Carolina at the annual meeting of the Southern Interstate Nuclear Board held in Austin, Texas.
April 20	Miss Walker spoke to a library science class at the University of North Carolina.
April 20	Mrs. Williamson gave a report at the Textile Information Users' Council meeting on the computer-searchable data bases available at NC/STRC.
April 25	Dr. Dewitt Myatt, Director of Science Communications, Inc., Falls Church, Virginia, visited NC/STRC to obtain information on establishing a technical information center in Puerto Rico.
April 26	The Library Director of the Medical University of South Carolina visited NC/STRC to discuss an annual subscription for a special project to be funded by the Library.
April 26 - 28	Mr. Chenery attended the regular meeting of the Action Council of Regional Dissemination Directors held in Albuquerque, New Mexico.
April 27	Mr. Neal attended the Solid Wastes Workshop held at the National Environmental Research Center, Research Triangle Park, N. C.
May 4 - 5	Miss Becky Walker, university coordinator, attended the N. C. Council on Technical and Managerial Services Conference held in Raleigh, N. C.

May 5	Mrs. Schroeder, director of communications, presided at the State Public Information Officers' meeting in Raleigh, N. C.
May 8	Mrs. Schroeder attended the Research Triangle Foundation meeting.
May 12	P. J. Chenery, director, met with the Vice Chancellor of UNC-Wilmington to discuss NC/STRC's TU program.
May 12	Roger Brower of Brower Instruments, Raleigh, N. C. visited with C. Leon Neal, applications engineer, to explore NC/STRC capabilities.
May 16	J. Graves Vann, Jr., applications engineer, attended the N. C. Council of Technical and Managerial Services in Raleigh, N. C.
May 18	Mr. K. Mahmood, Joint Secretary, Economic Coordination and External Assistance Division of the Government of Pakistan, visited NC/STRC to discuss the extent which technical assistance contributes to economic development.
May 19	Robert Huber of Hanes Corporation, Winston-Salem, N. C., visited NC/STRC to obtain information on our services.
May 23 - 26	Miss Walker attended the Conference on Contemporary Views of Learning and Conditioning held in Raleigh, N. C.
May 24	Mrs. Schroeder and N. F. Crawford, business manager, met with F. Durant of the Aerospace Museum, Smithsonian Institution; and with Bastian Wimmer and Clayton Edwards of Image Associates, Inc. while in Washington, D. C., visiting NASA Headquarters.
May 24 - 25	Mr. Chenery attended the N. C. Marine Science Council meeting at the Matimuskeet Lodge in North Carolina.
June 1	The 8th grade science class from Cary, N. C. visited NC/STRC and saw the NASA film, "A Man's Reach . . . ." Bob Potter, applications engineer, answered questions on the space program.

<b>June 1</b>	<b>Barbara Rice and Betty Johnson, medical librarians from Rex Hospital, Raleigh, N. C. visited NC/STRC to obtain advice on setting up an automated medical records system.</b>
<b>June 8</b>	<b>Robert B. Neel of Chem-Nuclear Services, Inc., visited with C. Leon Neal to discuss services.</b>
<b>June 9</b>	<b>E. H. Maher, assistant director for Center Development and External Affairs, NASA-Langley Research Center, Hampton, Virginia, visited NC/STRC for a briefing on the progress of the NASA exhibit to be held at the 1972 N. C. State Fair.</b>
<b>June 11</b>	<b>Miss Bridenstine participated in a short course in Automatic Text Processing taught by Gerald Salton at Cornell University.</b>
<b>June 12</b>	<b>Mr. Chenery represented North Carolina at the National Action Conference on Intergovernmental Science and Technology Policy.</b>
<b>June 16</b>	<b>Mr. Vann visited Reynolds Metals, Richmond, Virginia and presided over two showings of the NASA film, "A Man's Reach . . ."</b>
<b>June 17</b>	<b>Mrs. Schroeder went to NASA-Langley to view the Transpo '72 exhibits for their possible inclusion in the 1972 N. C. State Fair NASA exhibit.</b>
<b>June 21</b>	<b>T. R. Potter, Leon Neal, and Miss Walker attended a demonstration of the search capabilities of the Water Resources Abstracts file at the D. H. Hill Library, North Carolina State University, Raleigh, N. C.</b>
<b>June 21 - 23</b>	<b>Mr. Chenery attended the National Conference on Intergovernmental Science and Technology Policy in Harrisburg, Pa.</b>
<b>June 22</b>	<b>Mr. Vann attended the National Symposium on Technology Transfer held in Washington, D. C.</b>
<b>June 26</b>	<b>Mr. Chenery spoke on the subject of information retrieval at the meeting of the American Library Association held in Chicago, Illinois.</b>

<b>July 10 - 11</b>	<b>Mr. Chenery attended the meeting of the Resolutions Committee of the National Action Conference in Washington, D. C.</b>
<b>July 13</b>	<b>Charles J. Smith, a researcher from the Medical University of South Carolina, visited T. R. Potter and Miss Walker to discuss ways NC/STRC might assist him in an inter-disciplinary study on biological systems.</b>
<b>July 14</b>	<b>Mr. Calvert Willey and Dr. George Stewart of the Institute of Food Technologists met with Mrs. Williamson and P. J. Chenery to discuss the FSTA tapes.</b>
<b>July 17</b>	<b>Mr. Chenery attended the ASIDIC Executive Committee meeting in Atlanta, Georgia.</b>
<b>July 18</b>	<b>The Georgia Research Priorities Study Conference in Atlanta, Georgia was attended by Mr. Chenery.</b>
<b>July 21</b>	<b>Mrs. Schroeder and Miss Sylvia Sanders, applications engineer, met with Dr. Edwin Lotz of Burlington Glass Fabrics Company to obtain information on a NASA transfer case.</b>
<b>July 24 - 25</b>	<b>Mr. Chenery attended the Urban Technology Conference held in San Francisco, California.</b>
<b>July 25</b>	<b>George Hartman, Chief Engineer for ESB, Inc., Raleigh, N. C., met with L. M. Kelly and Graves Vann to discuss possible NC/STRC assistance on a problem.</b>
<b>July 26 - 28</b>	<b>Mr. Chenery attended the ACORDD meeting in San Francisco, California.</b>
<b>August 8</b>	<b>Wave Colver, librarian for the Environmental Protection Agency here in the Research Triangle Park, N. C., visited the Center to discuss our Library Search Service.</b>
<b>August 18</b>	<b>Walter Black from the National Laboratory for Higher Education visited the Center to discuss possible approaches to becoming wholesale clients.</b>

August 30	David Harvey, a graduate student at NCSU in Raleigh, N. C., visited NC/STRC to discuss our services.
September 20	Dr. Ernest Eliel, Professor of Chemistry, UNC-CH, met with Dr. Monica Nees, information specialist, and A. W. Lockwood, applications engineer, to discuss Chem Abstracts services.
September 24 - 27	C. Leon Neal, applications engineer, attended the National Environmental Information Symposium held in Cincinnati, Ohio.
September 27	Mr. Bill Harris, from Chemstrand, visited with A. W. Lockwood to discuss a demonstration of Chemstrand's flame-retardant fabric as part of the NASA exhibit at the 1972 N. C. State Fair.
October 9 - 10	Miss Walker attended the North Carolina Library Association Tutorials in Greensboro, N. C.
October 11 - 14	A. W. Lockwood, applications engineer, attended the Textile Information Users' Council meeting in Asheville, N. C.